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BY LEADING MEMBERS OF THE MEDICAL PROFESSION
THROUGHOUT THE WORLD

EDITED BY

HENRY W. CATTELL, A.M., M.D., PHILADELPHIA, U. S. A.

Director of the Ayer Clinical Laboratory of the Pennsylvania Hospital

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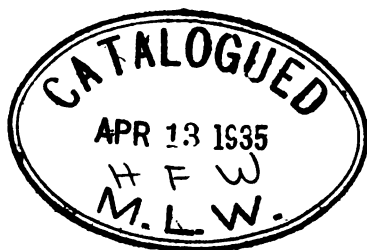
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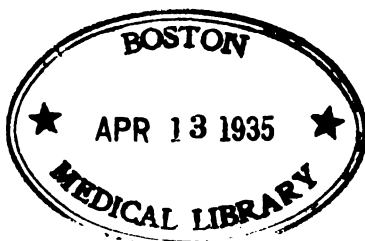
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Disease in the Philippines

and

Camp Sanitation

MEDICAL CONDITIONS EXISTING IN THE PHILIPPINES.

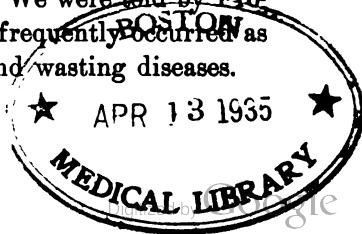
AMPLIFICATION OF REMARKS MADE BEFORE THE COLLEGE OF PHYSICIANS,
PHILADELPHIA.

BY SIMON FLEXNER, M.D.,

Professor of Pathology at the University of Pennsylvania.

THE Johns Hopkins University sent a medical commission to the Philippines in March last, for the purpose of studying the prevailing diseases in those islands. The commission consisted of Professor L. F. Barker and myself, with whom were voluntarily associated Messrs. J. M. Flint, F. P. Gay, and John W. Garrett. Through the co-operation of the Secretaries of War and of the Navy and of the Surgeon-Generals of the Army and Navy, credentials were supplied which insured opportunities for the study of all cases in the civil, military, and naval hospitals established in those islands.

The expedition started from Vancouver towards the end of March, 1899. A short stop was made in Japan, where the hospitals, the Imperial Bacteriological Institute, and the University at Tokyo, as well as the hospitals in some of the other cities, were visited. Several unusual forms of disease were seen in Japan, the most important of which, as bearing on our future studies, was beriberi, which was seen both as an independent affection and as a complication of tuberculosis or other chronic disease. We were told by Professor Aoyoma that in Japan beriberi not unfrequently occurred as a secondary affection in many debilitating and wasting diseases.



The next important stop was made at Hong Kong, where opportunity was afforded for the study of the bubonic plague. Through the courtesy of Dr. Lowson, the English civil physician in charge of the plague hospital and mortuary, we were enabled to study cases, as well as to make autopsies upon those dead of the disease. Up to May, so severe had been the epidemic that not a single case recovered during the preceding twelve months. In August, when we returned to Hong Kong, while the number of cases developing had not sensibly diminished, the severity of the pest was evidently abating, as shown by the fact that cases had now begun to recover. In the post-mortem work which we did, we were able to follow the several forms of infection now recognized, including well-marked cases of the pulmonary variety. We saw many instances of primary localization in the inguinal glands and a somewhat smaller number in the axillary and cervical glands. The form of infection last mentioned is regarded as being tonsillar in origin. We saw, moreover, one instance of what appeared to be involvement of the mesenteric glands, presumably from intestinal infection.

It may be of interest in this connection to say a word on the subject of the plague, as the disease has already invaded Europe and some of the more distant Pacific islands. Besides, its appearance in Hawaii and in the Philippine group makes the disease of very especial interest to Americans at this time.

I might say in passing that the disease was never introduced into the Philippine Islands during the Spanish occupation. This is explained by the vigorous quarantine regulations, which were at that time enforced. We conferred with both the medical officers of Manila and the Civil Commission regarding the question of danger from the importation of infectious diseases with especial reference to the plague. For obvious military reasons, namely, the dependence of Manila upon China for supplies, it was not desirable, if it could be avoided, to enforce the long quarantine which the Spanish had previously made obligatory. It was considered that a minimum quarantine of seven days should be required and, as that period was insufficient to cover the extremes of the period of incubation of the plague, that in addition strict examinations should be made on the departure of ships from points where the plague prevailed, and of the passengers upon their arrival at Manila. We afterwards discovered that it was customary to take the temperature

of persons sailing from Hong Kong and to exclude all those whose temperature was above normal and in the neighborhood of 100°. These persons were regarded as suspicious and were not permitted to proceed further.

We recommended to the Civil Commission the establishment of a public mortuary, where all cases of death from doubtful or unknown causes could be at once investigated. It was thought that this need was imperative on account of the dangers from the introduction of the plague which might at its beginning pass unrecognized. No such mortuary was established during our stay, and I am not aware that anything of the kind has since been provided, although it may have been since the quarantine regulations have now passed into the hands of the Marine Hospital Service.

The disease is one which is not always easy to recognize in its incipency, and on account of the fact that certain cases run their course without the development of external buboes, it may fail altogether to be diagnosed during life. Only the instances of inguinal, axillary, and cervical gland infections can be made out in the early stages of the disease. The rarer but very important pulmonary forms of infection are unassociated with primary buboes; and if, as may be hereafter proven, a primary intestinal form of infection exists,—a type of the disease already believed in by certain writers,—this group of cases, also, may pass entirely unrecognized until the post-mortem examination.

The bacilli of plague are thrown off in the secretions from the buboes when they ulcerate. They are present upon the mucous membrane of the mouth in the tonsillar form of infection, and, what is far more important, they are contained in the sputum in the pulmonary form of infection.

The life history of the bacilli outside of the body is as yet imperfectly known, but it is not a very short one. While thin layers of the bacilli, when dried upon various objects, quickly lose their vitality, it is probable that in soiled clothing and in albuminous mixtures they remain alive for a much longer period, especially when protected from the influence of light. It has just been shown by Gotschlich that the plague bacilli exist in the sputum in the pneumonic form of the disease for many weeks after convalescence. In one case they were demonstrable by cultures and animal tests as late as the seventy-sixth day following convalescence.

It would appear that when suppuration is established in the external buboes the pus-organisms then present overgrow and destroy the plague bacilli, so that we are as yet imperfectly informed as to the extent to which convalescent plague patients are dangerous to those about them. But the indications are that when the lungs become involved bacteriological tests alone will enable us to determine the time at which such patients can, with safety, be permitted to mingle with the healthy members of the community.

Inoculations with the Haffkin serum, which really consists of bouillon cultures of the plague bacillus killed by heat and preserved by means of the addition of carbolic acid, had been used very little in China at the time of our visit. They have been employed much more extensively in India and apparently with protective effects. Of course this serum is not curative, and thus far the curative sera which have been prepared by Yersin and Lustig, while they have given promising results, cannot be said to have established for themselves a basis of usefulness. The sera prepared by Yersin and Lustig are obtained by inoculating animals with the plague bacilli, or, in the case of Lustig's serum, with a nucleoproteid that is obtained by the action of acids and alkalis upon the bodies of the plague organisms. Lustig employs the horse into which he injects alkaline solutions of the nucleoproteid, from which animal he finally obtains a serum that is employed much in the same manner as the antitoxin of diphtheria in the treatment of diphtheria. This nucleoproteid of Lustig may also be employed as a substitute for the Haffkin serum for producing active immunity in human beings. Two injections are required at intervals of some days. The determination of the usefulness of these sera would have been more easily accomplished, and doubtless we should not now be in doubt about it, but for the prejudices of the natives in India to inoculation.

The agglutination test, which has given such excellent results in the detection of some other bacterial diseases, has thus far been of very little use in the plague, for the reason that it is in the first place difficult to obtain cultures of the plague bacilli free from the natural clumping of the organism, and in the next because reaction appears late in this disease and is an expression of convalescence rather than of the period of infection. It is interesting in this connection to note that human beings and animals treated with the Haffkin serum as well as with the nucleoproteid of Lustig develop

in their blood sera agglutinating properties towards the plague bacillus.

We arrived in Manila early in May, and, through the courtesy of Colonel Woodhull, the surgeon-in-chief of the Eighth Army Corps, and of Major Bournes, the chief health officer of the city of Manila, we were given immediate opportunities for the study of all cases of illness occurring within the territory embraced by the American military lines. Our laboratory was established in connection with the First Reserve Hospital, where we were given a small Filipino house on the banks of the Pasig, in which to set up our apparatus, carried from this country, and to settle ourselves for work.

There were then in Manila two civil hospitals, San Juan de Dios and San Lazaro; the latter being a leper asylum, in which one ward was devoted to the treatment of venereal diseases among the native prostitutes. The military hospitals were more numerous, the chief ones being the First, Second, and Third Reserve Hospitals, situated in Manila, the Convalescent Hospital, on Corregidor Island, and the Temporary Floating Hospital, supplied by the hospital ship "Relief," anchored in Manila Bay. The chief naval hospital was located at Cavite, where a small number of marines were cared for.

On account of the medical importance of the subject, I mention that at Cavite a large number of Filipino prisoners of war—about twelve hundred—were confined in the old Spanish prison. You may recall that this prison, which had been originally built for the Filipino prisoners of war, was afterwards, during the Filipino uprising, used for incarcerating Spanish captives. Since the American supremacy it has been put to its original purpose. It will not surprise you to learn that this prison, which had been erected by the Spanish for the natives, is most unhygienic and insufficient. It is really nothing more than a dungeon,—dark, damp, and altogether horrible. Its condition amply explains the outbreak of beriberi which in a short time became epidemic. Up to the time when we came away, some two hundred cases had occurred among these prisoners, with the mortality ranging from about thirty to forty per cent. At the request of Colonel Woodhull, an inspection of the conditions existing in the prison was made by us, and, upon the basis of our report, better hygienic provisions were made for the prisoners not yet ill. Those suffering from beri-

beri were transferred to the old Marine Hospital, which had been practically wrecked by the insurgents, but which was patched up and rendered more or less adapted for hospital purposes.

At this hospital we had the opportunity of studying beriberi, finding among these native patients the several recognized types of the disease,—namely, the wet or œdematous form, the dry or paralytic form, and the mixed form. The accompanying photographs (Figs. 1 and 2) show the several types of beriberi which prevailed. The various clinical features of these cases, as well as the pathology and the etiology of the disease, were studied. To obtain cultures of bacteria, large quantities of blood were transplanted to culture media and incubated in the ordinary way and also under anaërobic conditions. The study of autopsies made upon cadavers obtained immediately after death enabled us to make cultures from the various organs and secretions. None of these efforts, however, availed. We found no bacteria which had any positive relation to the disease, and we even failed to confirm the results of Pekelharing and Winkler, in that the pyogenic cocci which they had isolated were very inconstant in their occurrence and could readily be accounted for on the supposition that they were but the manifestation of an accidental or terminal infection.

The other diseases which were studied among the natives consisted chiefly of examples of leprosy in San Lazaro, and cases of supposed beriberi, which, however, proved, upon post-mortem examination at the San Juan de Dios Hospital, to be tuberculosis. As these last-mentioned cases have not as yet been studied histologically, it cannot be said that they did not represent terminal examples of beriberi, similar to those which had been encountered in Japan, where, as I have mentioned, such mixed infections are now generally recognized.

The native population suffers extensively from parasitic cutaneous diseases. Such patients are generally not invalided. The disease goes by the popular name of "Dhobie itch." The infection is evidently disseminated by the clothing and contact, and, owing to the fact that washing is done entirely in cold water and upon stones, it has been transmitted extensively to the American soldiers. This itch represents, according to our experience, at least two definite forms of infection, one being scabies and the other an affection indistinguishable from ringworm.



Fig. 1.—Bertbert, paralytic form, with atrophy of the muscles.



Fig. 2.—Bertbert, ectenous form.

Our chief work, however, consisted in the study of the American sick under treatment in the several military hospitals. I shall mention the principal diseases which were encountered. In the first place, Americans have proved to be very susceptible to dysentery. I think it is safe to state that that disease alone is responsible for more invaliding than wounds. As we encountered the disease, it prevailed as a very acute colitis, and also under the usual subacute and chronic forms. In the very acute forms the disease might terminate in from twenty-four to seventy-two hours after the onset of the first symptoms. The chronic cases lasted for weeks or months,

FIG. 8.



Drawing of organism found in cases of dysentery occurring in the Philippines. From an agar culture.

and these were not infrequently attended by secondary abscess of the liver.

In our study of this disease special attention was given in the beginning to the occurrence of amœbæ in the dejections of clinical cases, and to the intestinal contents, and to the secondary abscesses, when these existed, in the cases which came to autopsy. The amœba is an inconstant inhabitant of the intestine in these cases and is not regularly present in the secondary abscesses. On the other hand, amœbæ have been found in cases of diarrhœa, some-

times in great quantities, often exceeding the number usually present in dysentery at the height of the disease, and in the occasional mucous discharges of convalescent cases. This irregularity and inconstancy of presence of an organism which by some has been supposed to represent etiologically the cause of tropical dysentery led us to study closely the intestinal bacterial flora. As a result of this study, we were able to separate from a considerable number of cases, especially in the acute forms of the disease, a micro-organism belonging to the bacteria, which differed essentially from the ordinary intestinal inhabitants, and which possessed the property of agglutination with the diluted blood sera of patients suffering from this disease; whereas, on the other hand, blood from normal individuals, as well as that from those suffering from a variety of other diseases, failed entirely to react. The organism in question is pathogenic for the lower animals, and is still under investigation. (Frontispiece and Fig. 3.)

The other important enteric disease encountered was typhoid fever. This prevailed to a far less extent than did dysentery, and what was especially striking in the cases that ended fatally was that the lesions found in the intestinal mucosa were relatively slight. We met one instance in which the intestinal lesions were so little characteristic that without the bacteriological examination and the Widal test the diagnosis of typhoid fever could not have been established.

Malaria characterized by the presence of parasites in the blood also prevailed, although to a comparatively slight extent. A large proportion of the cases we saw had been sent in from the field and out-lying military hospitals, where the examination had to be hastily made, so that it was not surprising that many instances of so-called "malaria" or "intermittent fever" proved to be cases of other diseases (typhoid fever, dysentery, etc.). A number of cases of true malarial fever were however met with, and in the blood of these were found the characteristic parasites, identical with those occurring in other places where studies of the blood have been made. No quartan parasites were met with, but cases of quartan affection doubtless exist. The typical infections with the tertian and æstivo-autumnal varieties of the parasite were encountered by us as well as by some of the army physicians in the several hospitals.

The interesting forms of "*calentura perniciosa*," which occur

in Mindoro, Mindanao, and certain parts of Luzon, should be studied as soon as these regions are accessible. During our stay no instances of pernicious infection came to our notice, although we had the opportunity of studying a very small number of fatal cases of malaria. Some of the malarial cases were undoubtedly *recidives* imported from Cuba or elsewhere. Several instances of malarial pigmentation of the organs were noted in those dying from other diseases, men who as a rule had served in Cuba or Porto Rico during the Spanish War. Parasites in these cases were absent.

These are the principal diseases from which the Americans suffered. Others, both medical and surgical, were, of course, occasionally met with. Tuberculosis, diphtheria, and scarlet fever were the main ones of medical interest; but all the diseases mentioned were relatively of minor importance as compared with dysentery.

The bacillus which was isolated in our study of dysentery bears a great resemblance to, if it is not identical with, the organism recently described as the cause of epidemic dysentery in Japan, by Shiga, the assistant of Professor Kitasato, in Tokyo. A complete report on the study of this organism, as well as of the other diseases prevailing in the Philippines, will, it is hoped, be forthcoming within the next few months.

SOME OBSERVATIONS BY A NAVAL SURGEON IN THE PHILIPPINES.

PAPER READ BY INVITATION BEFORE THE COLLEGE OF PHYSICIANS,
PHILADELPHIA.

BY LOUIS F. ATLEE, M.D.,
Assistant Surgeon, U.S.N., Retired.

My experiences in the Philippines began on the 21st of October, 1898, when I arrived in Manila Bay on the unfortunate "Charleston," and ended on September 2, 1899, the date of my departure from Manila on board the "Solace," via Guam and Yokohama to San Francisco. During this time I was attached to the "Charleston," "Boston," and "Bennington," and visited ports between Manila on the north and Jolo on the south. I was attached to the "Boston" at the shelling and taking of Iloilo, the casualties on that occasion being a mashed toe from the passage of a gun-carriage wheel, and among the landing party a skin graze by a Mauser bullet, received by a sailor, who, like Achilles, was wounded in the heel. Being attached to a ship, and the natives of many of the ports we visited being unfriendly to Americans, much of my observation in such places was done through a telescope. If you will allow me to refresh your memory, I will recall to your minds that geographically the Philippines are a group of islands some 800 miles southeast of the Chinese coast, extending from 21° north to about 4° south. They are thus, very much indeed, in the tropics. North and east is the Pacific Ocean, west the China Sea, and a most uncomfortable one it is for landsmen. Being but some forty fathoms in depth, the strong trade-winds create a sea that many succumb to and pay their tribute to Neptune. South of the islands is the Celebes Sea.

Meteorologically the most important fact to recall is the blowing of the wonderful trade-wind known there as the monsoon, from the Malay word meaning a "season." This wind blows from the southwest from June to September, and is said to be created by the great mass of heated air ascending from the Central Asian plateaux.

The northeast monsoon blows from November until April, being the cold descending currents of air from the same plateaux, but when it reaches the Philippines the coldness has pretty well departed. During the southwest monsoon the rainy season prevails, and with the northeast wind comes drier weather. I say drier weather, for there is no time of year at which one can feel sure no rain will fall, only less than at other times.

The islands being mountainous, exposure or non-exposure to these winds and elevation are the principal climate-producing factors. Here in these steaming latitudes the sun may be said to pour down his rays vertically throughout the entire year. The coldest weather I experienced in Manila Bay was in the middle of July during a heavy wind and rain storm, and the most trying heat was in June. At this time in the earlier hours of the day, when the monsoon blew but feebly or not at all, and the air was almost saturated with moisture, the heat experienced on board ship, lying out on this mirror-like sheet of water with the sun raging down on us, was most uncomfortable and debilitating. Life is made bearable or not by the monsoon, and whether we were cooled by it or not depended on the time of the year, the trend of the coast, and the configuration of the land.

The effect on Europeans of living in this climate, apart from specific pathogenic influences, is, first, the great increase in the cutaneous activity; this effect is much more marked in some than in others. I have seen men who never got up from a meal without leaving the seat of their chair wet with perspiration, and, though almost all the naval officers slept on matting spread over their mattresses and with electric fans at their head, their pillows would be soaked by morning. After a more or less prolonged exposure to this climate the adipose tissue that does so much to round the contours of the body is considerably absorbed, occasioning a typical lean appearance.

The appetite for heavy viands is reduced, and it is well that it is so, for the digestive capacities are greatly lessened, disturbances of which functions are readily brought about by slight indiscretions. Many suffer from a mild chronic gastro-enteritis, these cases being liable to severe exacerbations if cause is given. I have seen unusually robust men who pooh-poohed suggestions as to being moderate in eating, and boasted they never knew they owned a

stomach, have most violent attacks following too great indulgence, attended by vomiting, purging, and collapse resembling cholera nostras.

Food in these islands does not have the same taste that it does here; this is partly due to the condition of the digestive organs and partly to the food itself. The fish I tasted were poor in flavor and either too soft or as hard as india-rubber; the fowls are thin, tough, and stringy; the beef is the same, and the pork no better; I ate of the latter but once, the results being disastrous. The poor food, weakened digestion, and enervating, continued heat bring about an appearance of anæmia. I am unable to say whether there exists a leucocytosis or a lessened amount of hæmoglobin, the necessary instruments for determining the matter not having been at hand.

There is no doubt that the capacity for work, either mental or physical, is much reduced. How that little work should be done is a matter for Europeans to learn. During the intensely hot part of the day they would do well to keep as quiet and cool as possible. We could learn a lesson from the ever-patient water buffalo, the beast of burden of the islands. To plough a piece of land requires three buffaloes, a man, and a boy. The man takes one beast and ploughs very gently; the boy takes the two others—one he puts to graze, the third to wallow in a mud puddle. After one hour's work the ploughing animal is put to wallow, the grazing one to work, and the wallowing one to graze; and so they alternate, *seriatim*.

The natives, as seen by me in the coast towns which we visited, are much mixed as to race. Not to go back further than the advent of the Spaniards, the natives whom they found occupying the coasts were of Malay origin, they having forced the aboriginal negritos back into the interior, up the mountains. The race now living on the coast is a mixture of native, Spanish, and Chinese blood. The type produced is not a high one physically. From those who have been among them for some time I learned that they are shrewd business men, cunning and deceptive, not knowing what it is to tell the truth, acting on the principle that language was given to us to conceal our thoughts. Their faces are broad and flat, with high cheek bones, black eyes, and coarse, straight, black hair. They are small of stature, narrow-shouldered, with poor thoracic development. Our troops look like giants among a lot of monkeys when

mixed in a crowd of Filipinos. The skin is sallow, and all have the appearance of being poisoned with tobacco, to the incessant use of which they are addicted, in the form of cigarettes and a cigar made by rolling up a leaf. Its use is common to both sexes and even small children. In a country where food is scarce and comparatively expensive, the use of tobacco is no doubt prompted by the relief which it gives to the cravings of hunger. These people look poorly nourished. Labor is fearfully cheap: the earnings of an able-bodied man on a sugar estate in the interior are but two dollars per month, with a small daily ration of corn or rice.

The women of these people have one admirable characteristic,—that of holding themselves very erect, due to the habit of carrying bundles on the head, which is begun at an early age, it being common to see little girls strolling about the streets nonchalantly with a gin-bottle balanced on the top of their heads. Several miles back in the interior I have passed girls not more than fifteen years of age carrying in this way baskets of bananas weighing not less than thirty pounds, which they are obliged to carry several miles to the coast towns. It is said that pelvic deformities result from this practice, and that death in childbirth frequently occurs.

The native children seen about the coast towns were far from robust looking, the protruding abdomen, emaciated limbs, and sallow color suggesting poor food and unhygienic surroundings. The birth-rate is high, but the death-roll of infants is fearful. An army officer stationed at Cebu told me he had observed so many little coffins passing his quarters on the road to the cemetery that he had grown suspicious, and gave an order to have them examined, as he feared arms were being smuggled out of the town in that way.

As to the diseases prevailing among the natives, tuberculosis stands pre-eminent, manifesting its ravages in the skin, bones, and viscera; the mortality is very large. Syphilis, acquired and inherited, runs rampant, and if I judge by the results of visits on shore by the navy *personnel*, the soft sore and gonorrhœa are very prevalent.

At the city of Cebu I saw a number of cases of beriberi, which prevails to some extent during the rains; the natives believe it only attacks those who go about with their feet unshod. The disease was of the usual type, anæmia, anasarca, and neuritis being the prominent symptoms.

In that city I also saw a large number of lepers, all the types of the disease being present; lepra mutilans was apparently the most common. There were many children among them. During the Spanish occupation the lepers were restricted to a well-constructed hospital under the care of a sisterhood, but since their departure the hospital is going to ruin and the lepers are free to roam where they will, which is, perhaps, unwise.

Smallpox appears to be more or less endemic in the islands; on many it has left its disfiguring impress, and a not uncommon sight is a little child running about the streets in the late stages of the disease.

The Europeans residing in these islands are almost entirely limited to the coast towns. Naturally it was these only who came under my observation. The Spaniards made their first settlements and built their first cities at the mouths of small rivers. They are thus situated on alluvial deposit, flat, marshy, and difficult to drain. In such places we find all the conditions formerly believed to be requisite for the production of the paludal diseases,—heat, moisture, and dead vegetable matter. In the neighborhood of Manila and Cavite, landward, was formerly a highly cultivated country which is now a desert waste. Here will surely be exemplified the old adage,—“war, famine, pestilence.” Land once cultivated and allowed to run to waste is said to be particularly productive of marsh fevers. To this cause has been attributed the virulent forms of marsh intoxication found in the Roman Campagna, where these conditions exist. The mosquito is abundant everywhere apparently; but I am unable to say whether it exists in the form said to act as the medium for the inoculation of the human subject with the malarial plasmodium.

At the small town of Cavite, that figured so conspicuously in the earlier news from the Philippines, the Spaniards maintained a small naval station, but owing to its unsanitary location they constructed on a sandy point some three miles away a very complete hospital. This was occupied by the Filipinos for some time as barracks, and wrecked by them; so that our navy, needing a place on shore to treat the sick of the fleet, fitted up, very ill-advisedly as it turned out, a small hospital in the second story of one of the storehouses in the navy-yard, the result being that many of the cases sent there for treatment developed a peculiar form of

continued fever, at first looked on as dengue, but there are no joint complications and no relapses, as in the latter disease. It is preceded, for some days by general malaise, anorexia, and constipation, and begins by chilly sensations, followed by a gradual rise of temperature, reaching its height in from twelve to twenty-four hours and lasting from three to eight days, gradually subsiding and seldom reaching higher than 104° . During this time severe pains are complained of in the head, back, limbs, and joints. The usual symptoms observed during any fever, such as coated tongue and scanty urine, are present. Sometimes during the course of the disease a papulo-vesicular rash appears, most marked on the forehead, chest, abdomen, and anterior aspect of the body generally. The treatment of this disease eventually became purely expectant; though quinine was at first tried in many ways and forms, the only effect produced was a great increase in the cephalalgia. Fractional doses of calomel and neutral mixture gave the best results. The general condition resulting from the fever is often serious, the profound anæmia and debility being very slowly recovered from in that climate.

At one time during my service on board the "Boston" attention was called to the great number of infected wounds prevailing, slight abrasions of the skin taking on an unhealthy action; at the same time a severe case of erysipelas of the leg presented itself. Several cases of pneumonia developed, which had not resolved several months after their occurrence, the whole series of conditions suggesting a wide-spread streptococcal infection on board. The same conditions prevailed on board the "Charleston" at one time when I was attached to her. The pneumonia cases were afterwards invalided to the United States with the doubtful diagnosis of tuberculosis.

Dysentery is common in those who live on shore and are not careful as to the water or uncooked vegetables which they use. The cases which I saw suggested the amœbic form, from the frequent relapses in spite of care.

Exposure to the continual heat produces in the European skin severe outbreaks of prickly heat, or "lichen tropicus," particularly aggravated in those addicted to the use of alcohol, but many suffer who never look on the wine. I think I can verify the old belief that those who suffer severely from prickly heat are more or less exempt from gastro-enteric disturbances, and *vice versa*.

Of parasitic skin diseases tinea in most of its forms was the only one that came under my notice, but it was naturally in a very severe form, particularly when situated about the genital region, extending, as it frequently did in these cases, to the thighs, buttocks, and abdomen, the continual scratching to relieve the itching bringing about a severe condition. A peculiar brown staining of the skin accompanies this disease, not seen outside the tropics, I believe.

The effect on European women of continual residence in these islands is particularly marked on the generative functions, as evidenced by excessive menstruation, frequent miscarriage, sterility, or the bearing of children too poor in vitality to be reared.

We will, no doubt, have the same experience as the Anglo-Saxon had in India, and exist in the Philippines only as exotics.

CAMP MANAGEMENT.

BY HENRY LA MOTTE, M.D.,

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THE best management of military camps will be one which keeps in mind two different, but not widely different, objects,—first, military efficiency; second, sanitary efficiency.

The commanding officer in order to maintain military efficiency will be obliged to pay much regard to sanitation, but the best sanitary officer may be entirely regardless of the first, and frequently the most important, object of camp management. I say most important because military camps are established for the purposes of training men to live together, move together, and fight together,—that is, to be soldiers, and, when made into soldiers, for the purpose of keeping them at or near the point where they can be equally and efficiently used as soldiers. If the maintenance of the health of the individual soldier were the object of primary importance, this would be most readily obtained by dispersing the men to their homes. This proposition is evidently absurd; but not less so is the idea of some purely military men, that, having assembled men in regiments, brigades, divisions, or army corps, the duty of providing for the maintenance of the health of the units of the military body takes a minor place and should be left to the medical officers who alone are to be held responsible for the cure of the sick, yet who have little or no power to prevent the development of disease. It seems to me that military and sanitary officers should be jointly held guilty when epidemics decimate armies, until the one can show that he followed all the recommendations of the other and still sickness came, or until the other can prove that measures suggested for its prevention were not heeded.

The relative importance of the military and sanitary stand-points depends largely upon the conditions which govern the establishment of the camp. In times of peace, for the purpose of drill and instruction to officers, camp sanitation is by far the most im-

portant matter for the attention of the commanding officer. In war times, particularly while in active service in the enemy's country, it is natural that to the commanding officer the military features of the situation should be more important, or *may* be more important, than the hygiene of his camp.

As examples of how camp management should be modified to meet the sanitary indications on one hand and the requirements of the military situation on the other, may be cited the two camps under the command of R. W. Huntington, of the United States Marine Corps; the first, established on Sandy Hook, New Jersey, for the purpose of guarding the country from the dangers of a cholera epidemic, in 1893, when this gentleman was a major, and the second, on the ridge between the sea and the bay of Guantanamo, Cuba, during the months of June, July, and August of 1898, when, as a lieutenant-colonel, he commanded the marine battalion.

In the first instance the camp of three hundred marines was established on a site which would not have been chosen but for the military requirement that the camp should be sufficiently near to Camp Low, which had already been established as a place of detention for immigrants arriving in ships upon which cholera had appeared. The military features demanded the safeguarding and detention in their camp of the suspects referred to; the sanitary demand required that the camp should be at such a distance that, by quarantine and all other methods at his disposal, the commanding officer could prevent the cholera from spreading to his camp. Here, then, the sanitary situation was paramount, and much more difficult to meet than the military situation. This fact was impressed upon the minds of his officers by Major Huntington. He gave his medical officer wide authority in the issuance of orders to protect the health of the camp; and, by strict and careful attention to details and enthusiastic co-operation on the part of his subordinates, commissioned and enlisted, the major was able to return his command to their stations, after this camp had been abandoned, with a lower sick-rate than any other command of equal size in the navy; and this in spite of the fact that two deaths had occurred, one from purpura hæmorrhagica and one from typhoid fever during the first week of the camp's existence, the latter case being unquestionably chargeable to the previous station of the patient.

The record of the camp at Guantanamo is so brilliant and well

known that it requires no argument to show that, while the military features of the situation were considered by far the most important, this, the first camp held by the forces of the United States on the island of Cuba, was so ably managed from a sanitary aspect that not one of the six hundred men there encamped through the sickliest months of a tropical summer lost his life by disease. Colonel Huntington's method was to give his medical officers the greatest possible authority for the enforcement of all sanitary measures which would not interfere with the military features of the situation. And, if by this method his medical officers were able to earn an enviable reputation for efficiency, is not the commanding officer's record equally enhanced thereby?

According to the report of Surgeon John M. Edgar, U. S. N., of the marine battalion at Guantanamo, the following orders were issued by the commanding officer upon his recommendation: (1) Drink no water except distilled or boiled; (2) Keep out of the sun unless exposure is necessary; (3) When clothing becomes wet, change if possible; (4) Drills and all labor possible to be performed before 7.30 A.M. He further states that, except when on picket and for a short time after their arrival at Guantanamo, the men slept on dry flooring, an extra allowance of coffee was served, and frequent sea-bathing was encouraged. There were no deaths from disease nor any serious sickness while on Cuban soil. Before landing at Guantanamo a number of houses on the site to be used for the camp were fired and destroyed, to prevent contagion; quarantine was observed against ships and persons coming from parts of the country where yellow fever was known to exist. In the fighting which occurred six men were killed and fourteen were wounded. Assistant Surgeon Gibbs was one of the first killed in action. After the return of the battalion to the United States and before its disbandment, for a period of thirty-nine days there were only fourteen admissions to the sick list, and all of these were later discharged to duty cured.

From what I have observed, I am inclined to lay down the following proposition: The better the commanding officer understands the difficulties of the medical officer's situation, the more authority will he accord to the medical officer and the better will be the service he receives.

In the camp of the First Volunteer Cavalry at San Antonio,

Texas, the medical officer, who had had some experience in camp sanitation, was given almost unlimited authority to act "by the colonel's order," and this, in my opinion, was because the colonel had been a medical officer in the army himself, and realized how much good could be done by a surgeon with free authority and how little this privilege would be abused by a gentleman. In that particular regiment it was not necessary to urge the necessity of squad and troop messes, as against the "every man his own cook" habit, too common among most volunteer organizations. A great majority of the men in this regiment had spent their lives in camp and knew the value of the proper preparation of their food, even when that food consisted of nothing more delicate than beans, bacon, hard-tack, and coffee. But these men and their officers could not at first understand why it was necessary to clean the coffee-cups immediately after use, why scraps of bacon and other food could not be thrown recklessly about the usual eating-place, why it was necessary to gather up all waste bits of food and throw them into trenches which it took much time and labor to dig, and why these trenches should have their contents covered with fresh dirt at least three times a day; but they could understand a command to report to the colonel and explain why an order in his name had not been executed.

The health of this regiment at San Antonio and afterwards at Tampa, Florida, was excellent. An outbreak of measles occurred while the regiment was *en route* to Tampa, and a few cases broke out at intervals of a week or ten days for several months afterwards; this probably would not have occurred in a permanent camp, but was unavoidable from the military features of the situation. An unusually effective weapon for guarding the health of this particular command was given the surgeon by the commanding officer very shortly after the formation of the regiment,—namely, authority, at his discretion, to leave behind all sick and injured men in case the regiment should embark for service beyond the United States. With this authority many men, who would have been but a drag upon the movements of the command, were left behind when the regiment embarked for Cuba.

After landing at Daquiri and Siboney the Fifth Army Corps for several days had no properly arranged camps. The various regiments bivouacked upon their lines of march; the necessity of rapid

advance precluded any attempt to select suitable camping grounds, and obliged the regimental commanders, in most cases, to encamp upon the sides of the road where they were overtaken by the night.

On June 25th the advance of the army went into camp upon a grassy plain, about three miles square, situated nearly half-way between Siboney and Santiago de Cuba. Here, as the other regiments came up, they went into camp, with the understanding that they would remain about one week. No further orders, as far as I can ascertain, were issued by the general officers than that the stay in camp would be for several days, and the regimental commanders were instructed carefully to guard the health of their men; it was here that the greatest difference was observed in the efficiency of the various commanders. In every case, as far as I was able to observe, the best-managed camps were those commanded by experienced officers, between whom and their regimental surgeons there existed the heartiest co-operation.

Great care was exercised by the commanding officer of the First Volunteer Cavalry in the selection of a site for his camp. Shelter-tents were pitched and the men ordered to cover their tent-floors with dry grass and palm-leaves. Latrines and sinks were dug, two for each troop, one for the head-quarters staff, and one for the hospital; the men were instructed to change their clothes, when practicable, after getting wet; and troop commanders, first sergeants, and company cooks were instructed by the surgeon in the proper use of tropical fruits, especially of the mango, which grew in this neighborhood in profusion. The men were advised to eat only the ripe fruit which had no suspicion of decay, but were told that unripe mangos could also be eaten if cooked, and "mango apple-sauce" became a favorite dish while in this camp. (In another regiment encamped near by, where no instruction had been given with regard to this fruit, there were eleven cases of severe strangury caused by eating green mangos, which contain a large amount of turpentine, which is, of course, driven off by cooking.) Officers and men were ordered to drink only coffee, this order being more easily enforced than the more usual one to drink boiled water, and having the same effect when enforced. Sanitary inspection of the entire camp was made twice every day by the medical officers. From the time this command left Tampa until the battle of San Juan Hill, three cases of

typhoid fever and about fifteen cases of measles developed, and these were the only instances of sickness in the command.

A volunteer organization whose camp I inspected about this time was managed on an entirely different principle. There was no attempt at squad or company kitchens, no sinks were dug, and scraps of food were thrown upon the ground wherever most convenient, and it seemed to me that this particular camp had attracted to it most of the flies living in that part of Cuba. The commander of this organization was not a regular army officer, but he had been in camp with his troops several times before. His medical officers were probably good physicians, but they seemed to have no idea of camp sanitation, and, worse than all, the colonel and his senior medical officer had disagreed about some question of rank and privilege, and now, with the lives of a thousand men in their safekeeping, each was standing upon his dignity and refusing to communicate with the other, even, apparently, upon questions of vital importance to both. I was not surprised to learn later that this regiment had on one day over six hundred men on the sick-list, and upon one occasion the burial of a man from one company required a detail from two other companies because there were not enough well men in his own company to dig a grave in which to bury him.

The recommendations of the brigade and corps surgeons, that the fever-infested houses at Siboney be burned, were disregarded, and for the failure to approve of these recommendations, I should hold the military commander responsible for several cases of yellow fever which appeared among the troops at this place.

The camp at Montauk, Long Island, to which the Fifth Army Corps was sent to recuperate after the campaign in the tropics, should have been managed entirely with the view of providing the best sanitary conditions. In the Brazilian and Uruguayan armies, when a regiment or detachment of troops becomes seriously weakened from paludal fevers, it is an invariable custom to send it for recuperation to some station at a considerable elevation, away from the sea-coast, and the effect upon the troops so transported from an enervating to a bracing climate is most beneficial. Understanding that the Fifth Army Corps was being sent to Montauk Point for the purpose of recuperation alone, and believing that a station on low ground near the sea-shore would not be as beneficial to the health of the command as one upon a higher elevation further in-

land, I addressed a communication to the Secretary of War, recommending that one regiment at least be sent to the hills in Western Massachusetts, where I offered to provide a camp-site and a hospital building at my own expense, in order that the statistics of the command there located might be compared with those stationed at Montauk Point. This letter was referred to the Surgeon-General of the army, who disapproved of the proposed experiment, and so the plan had to be dropped. I should be much more enthusiastic in the support of the bill to give the Surgeon-General the rank and pay of a major-general had he shown some willingness to give the thirty-five men from my regiment who died at Montauk Point a better chance for their lives.

That portion of the First Volunteer Cavalry which remained behind at Tampa under the command of a volunteer officer who had not been in the regular army, who quarrelled with his medical officer on all occasions, who disapproved of nearly all his recommendations, who curtailed his powers to the utmost, and who, when his medical officer was stricken with typhoid fever, endeavored in every way to make his hard lot still harder, suffered that which its commander might have known would have been the result of his actions; having divested his medical officer of all authority and as far as possible of the respect due him by his men, the attention to camp hygiene became *nil*, and the command wasted so that when it arrived at Montauk Point more than half of the men were, or had been, upon the sick-list. At Montauk the command of the regiment devolved for a while upon another volunteer officer who, when the daily sick-list was between one hundred and fifty and two hundred, placed one medical officer in arrest, relieved another from duty, and asked the other to resign. From this state of affairs the rejoining of our lieutenant-colonel, an old regular army officer, in a measure relieved us, and an attempt was made to re-establish the authority of the medical officers, but it was too late to prevent much of the ill which might have been avoided.

Even under the unfavorable climatic influences at Camp Wick-off, examples were not lacking to show how intelligent co-operation between the commanding officers and their surgeons could check any serious outbreak of disease.

The camp of the Sixth Regular Cavalry was commanded by its senior captain, George S. Anderson, its surgeon being Dr. Frederick

D. McMasters, who had as a private trooper done heroic work on the firing line of our regiment in Cuba, having, as his hospital tags could prove, rendered first aid to over seventy per cent. of the men wounded in our regiment. These two excellent and mutually respecting officers, working for the common good of the regiment whose health they were safeguarding, were able to make returns showing the health of their men during the stay at Montauk to be about the same as that of troops in garrison.

I believe that official figures will show that the volunteer organizations at Camp Wickoff, Montauk Point, had a sick-rate nearly twice that of the regular regiments there encamped.

From what I have said, the conclusion naturally follows that, in order to have good camp management in the United States volunteer troops, none should be commissioned to and above the rank of major save officers from the regular army who have served in the field. The surgeons of volunteer organizations should be younger officers of the medical corps of the army who have served in the field; and, when the commanding officer and his chief medical officer cannot work in harmony, one should resign, and I am not certain that it should always be the medical officer. The rest is a matter of detail.

TYPHOID FEVER AMONG THE TROOPS AT CHICKAMAUGA IN 1898.

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Now, more than one year after we were first shocked by alarming statements concerning the mortality among our soldiers in the national encampments in this country, we may safely discuss the questions which disturbed us so much at that time. Were the percentages of sickness and death among those of our soldiers who remained in this country during the late war with Spain as great as they were believed to be a little more than a year ago? What were the chief causes of sickness? Were the conditions of the encampments unsanitary, and, if so, why? If the morbidity and mortality were great, who was responsible? What suggestions can be made for the improvement of the sanitary conditions of military encampments? Are there imperfections in the medical service of our army which might be removed? These are questions which, it seems to me, might prove interesting and instructive. In attempting to answer them, I shall give testimony based upon personal observation in the field and in the hospitals and upon information obtained from a careful study of the medical records in the office of the Surgeon-General. In order that I may make definite rather than general statements, I will confine myself to the study of typhoid fever among the troops encamped at Chickamauga Park in 1898. For the sake of completeness, I shall follow some of the regiments of the First and Third Army Corps after they left Chickamauga.

The statement has frequently been made that Chickamauga Park is naturally an unsalubrious place and that it should not have been selected for a national encampment. While inspecting the troops at this place in 1898, we were told that Chickamauga was an Indian word meaning "river of death," and it was a wide-spread belief among the soldiers that the location was naturally an unhealthy one. Let us investigate this point.

The surface of Chickamauga Park is gently rolling, with such natural drainage that the excess of water falling upon it in the heaviest rains soon flows away. There are no morasses or swamps within the Park. The surface is partly cleared and partly wooded, but everywhere the undergrowth has been cut out and there is no dense forest. There are occasional areas that are somewhat flat and may be damp during a rainy season; especially is this true where a flat surface is covered with woods. With the exception of these localities, there is no part of the Park where an excellent site for a regimental camp might not be selected. Most of the gullies that drain the Park are dry except for a short time after rains. There are, however, some small streams which are fed by springs and flow continuously. Most of the drainage from the Park ultimately passes into Chickamauga Creek, which flows along its southeastern border. A large part of the Park is underlaid with magnesian limestone, upon which there is a deposit of gravel varying in depth from a few inches to many feet. The outcropping rock in many places is broken and fissured in every direction. So far as the surface and the soil are concerned, there is only one objection to Chickamauga Park as an encampment for a large body of troops. This objection lies in the difficulty, universally experienced in the summer of 1898, in digging sinks of sufficient size and depth and in procuring proper material with which to cover their contents. In many places pits could be made only by blasting, and when thus made were of insufficient size and could not be properly cared for.

It is a matter of surprise that many of the regiments located at Chickamauga encamped in the wooded portions. There were some reasons for this. In the first place, many of the regular commands were temporarily encamped in the Park during April, 1898, before the arrival of the volunteer regiments. The regular troops left the Park late in April or early in May, and most of them went to Cuba. The volunteer troops on arriving found that the most desirable sites in the open portions had been occupied by the regular soldiers, and, recognizing the fact that it was not safe to occupy sites so recently vacated, they felt compelled in many instances to locate in the woods. In the second place, the open areas were in part reserved for drill-grounds. There were daily regimental and brigade drills and less frequent division and corps exercises. Thirdly, some of the open fields had been leased from the govern-

ment by individuals who refused to allow the troops to occupy these lands. This necessitated negotiations, which took time, and meanwhile some regiments encamped in the woods. However, I am of the opinion that a great deal of stress should not be laid upon this fact. As has been stated, these woods were not dense; they were well lighted and penetrated by the rays of the sun in every part. It is possible, however, that the sites of a few of the regiments, notably that of the First Mississippi Volunteer Infantry, were in places too densely wooded.

So far as the locations of the regimental camps are concerned, there is one criticism that must be made by those who know anything of military sanitation. There is no adequate reason why the regimental camp-sites in Chickamauga Park should not have been changed every three weeks, and yet it is a fact that many a tent pitched there in May was not moved until the commands dispersed late in August. The records show that medical officers petitioned time and time again for change in camp-sites, and that such petitions were in many instances wholly ignored. Every one versed in camp sanitation knows that under the very best conditions any given location will become more or less contaminated and unfit for occupation after a few weeks, and it is strange that the desirability of frequent changes in camp-sites in Chickamauga Park during the summer of 1898 was not recognized and acted upon by superior line officers.

On account of the rolling character of the surface and the geological formation already described, it sometimes happened that one regiment had its health endangered by drainage from other commands. This was so plainly the case in the Second Division of the Third Army Corps that it is strange that it was not early recognized and that the camps of some of the regiments were not changed.

One of the larger creeks, known as Cave Spring branch, through its tributaries receives the drainage of a large portion of the area covered in 1898 by the encampments. This flows into Chickamauga Creek, and the relation of the junction of these two streams to the intake of the general water-supply will be referred to later. On account of the variations in dip of the layers of limestone and also on account of the crevices in the strata, the drainage is not always on the surface. Water falling on an elevated area in the Park in

part passes down between the tilted and broken layers of limestone and may reappear at the foot of the hill. If the distance traversed by the percolating water under the ground is short and the depth of penetration is not great, a wet-weather spring results; on the other hand, if a larger volume of water accumulates under the ground and percolates to a greater distance, a permanent spring is formed. The layers of limestone vary much in thickness. In some places they are superimposed one directly upon the other; in other localities they are separated by deposits of clay almost as hard as the rock itself, so that in drilling there is no noticeable difference between rock and clay. On account of the fissures in the clayey deposits between the layers of rock, the water of many of the smaller springs, of some of the larger ones, and of some of the wells became more or less turbid after heavy rains. This can be accounted for only by contamination with surface drainage. It will readily be seen that with the conditions as here described a polluted surface necessarily led to contaminated water-supply.

Through and about the Park are numerous large springs, supplying an almost unlimited quantity of water, which is apparently of the very best quality. Undoubtedly when there is no unusual surface pollution of them, the water from any and all of these springs is perfectly safe. However, the largest of them may be contaminated to a greater or less extent by surface drainage. Crawfish Spring, the flow of which is estimated at sixty million gallons per day, sometimes becomes muddy after heavy rains. In its normal state this is one of the most beautiful springs in the world. Numerous large springs, such as Sweet Spring, Blue Spring, Georgia Mineral Spring, Rossville Spring, etc., located outside of the Park, furnished drinking water for the troops. From most of these, water was dipped in pails, the man dipping the water standing upon the edge of the spring and the water often falling over his boots and possibly contaminating the source of supply. The water was hauled to the camps in headless barrels, which were deposited in the company streets, and from these the men dipped, with clean and unclean cups, possibly with clean and unclean hands, the water which they drank. The possibility of occasional contamination of portions of the water obtained in this way was not insignificant.

I am quite confident that some of the wet-weather springs

already referred to became specifically infected with typhoid fever. This certainly must have been true in the Second Division of the Third Army Corps. The numerous wells throughout the Park differ considerably in construction. It is generally believed that all of them are driven wells, but this is not true. General Boynton, Chief Commissioner of the Park, made to us this statement: "We had nine driven wells here when the troops began to arrive. These had been in use two or three years. Soon we saw that the supply from these would be insufficient. We obtained five drilling-machines and began to put down wells as fast as we could wherever they were wanted. Most of this drilling was done before the rainy season set in. In boring for these wells we passed through gravel and loose rock near the surface, then we struck very solid rock, which ranged in thickness from ninety-two to one hundred and sixty-eight feet. A few of the wells are bored through less than eighty feet of rock, while others are carried through one hundred and sixty-eight feet. In drilling there is no evidence of cavities. The water flows in when we get down to what we call the water-bearing stratum. Usually while boring it is found necessary to pour water into the hole to facilitate the action of the drill. After the water-bearing stratum has been reached, the water rises to within ten feet of the surface, sometimes nearer. For instance, the well at the McDuffield place, which is one hundred and sixty-eight feet deep, was perfectly dry through one hundred and sixty-four feet of rock, and as soon as we got to the water-bearing stratum it came up to within four feet of the surface. At the Brotherton place the well is one hundred and twenty-five feet deep and most of it through solid rock, and the water comes to within four feet of the surface."

When our board inspected the encampment at Chickamauga, the testimony given us concerning these wells and the water obtained from them differed considerably. General Boynton stated that the water from three of the driven wells became cloudy after heavy rains. Others testified that this was true of many of the wells in the Park. There can be but little doubt that there was surface contamination of some at least of these wells, and possibly the water from these may have served as a factor in the distribution of typhoid fever.

In addition to the above-mentioned sources, water was pumped from Chickamauga Creek and distributed by means of pipes through

the various organizations encamped in the Park. The only troops that did not receive piped water from Chickamauga Creek were the Second Division of the First Army Corps. The regiments of this division were located at quite a distance from any of the pipes, and water from this source could have been used by men belonging to this division only occasionally. The intake of the water-supply from Chickamauga Creek was most unfortunate. As already stated, a small stream, known as Cave Spring branch, drains a large part of the territory covered by the encampments and empties into Chickamauga Creek. Now, the intake of the general water-supply was located dangerously near the junction of these streams. In fact, the intake was immediately at their junction; but Cave Spring branch was deflected from its course by a canal and a dam, so that it emptied into Chickamauga Creek about forty-five feet below the mouth of the intake pipes. The first attempt made to deflect this stream was by means of a flimsy riprap wall made of brush and broken stones. This poorly constructed dyke was washed away by the first heavy rain, and Cave Spring branch resumed its original course and flowed into Chickamauga Creek directly around the three intake pipes. It is true that as soon as this was discovered the pumping of water was stopped; but there never was any adequate excuse for taking the water from this point, and there can be but little doubt that the water supplied through the pipes did on more than one occasion become contaminated with the drainage from the camps flowing into Chickamauga Creek through Cave Spring branch. With typhoid fever generally distributed through the regiments and with drainage from all of these camps swept into this stream, it was impossible for the water of Cave Spring branch to have escaped specific contamination with the typhoid bacillus, and it is well-nigh impossible to believe that the water of Chickamauga Creek pumped through the pipes and distributed through the commands altogether escaped this contamination. However, I am convinced, from the distribution of typhoid fever through the different organizations, that contamination of the water-supply was only one of the means through which the disease was spread. Moreover, as already stated, the Second Division of the First Army Corps was quite removed from the water-mains and pipes, and yet this division suffered like the others from typhoid fever. For these and other reasons, I am inclined to think that infected water was not

the chief source of the spread of typhoid fever among the troops encamped at Chickamauga.

I have already referred to the difficulty that was experienced in digging sinks of proper depth. The rocky nature of the soil in many places made it impossible to provide pits of proper dimensions. When rock has to be blasted in order to prepare a sink, the result must always be more or less unsatisfactory. Moreover, the difficulty in providing and caring for the sinks was not confined to their construction. The amount of dirt thrown out in the digging was inconsiderable, and, after it had lain on the surface exposed to the sun, it became almost as hard and non-porous as rock. When this dirt was thrown back into the pit, it did not absorb the liquid contents, but simply displaced the watery material, and when used in considerable quantities it caused an overflow. There was an almost universal complaint from regimental medical officers that lime could not be obtained early in the season for the disinfection of sinks. It seems strange that no one apparently ever thought of the possibility of manufacturing enough lime to supply the entire encampment. There is in the Park an abundance of wood and also of limestone. The construction of a few limekilns would not have been a Herculean task with the large number of men on hand, and an abundance of lime might have been thus supplied. However, I am satisfied that, if there had been no deficiency of lime, the condition of affairs would not have been greatly improved. The thorough disinfection of the excreta of sixty thousand men when deposited in pits in the earth, and especially when scattered on the surface, is not an easy task.

It may be regarded as an axiom that, wherever and whenever a large number of men assemble and allow their own excretions to accumulate about them, there and then typhoid fever will appear and will spread. It must not be inferred that this disease ever originates *de novo*, nor should it be understood that the colon bacillus or any other germ present in the normal excretions of man can develop into the typhoid germ. Typhoid fever is so widely distributed that in any large assembly of men collected from different parts of the country there will be some already infected with this disease. From the dejections of these infected men, the typhoid bacillus will grow and flourish in polluted places and the disease will spread. If the troops at Chickamauga had been provided with

ample means for disinfecting all excretions, I do not suppose that typhoid fever would have been altogether unknown; but the disease might have been limited to the men who reached the camp infected; at least, there could have been no wide-spread epidemic.

It must be evident to any one who studied the conditions of our camps in 1898 that some substitute must be provided for the pit system in permanent encampments. While troops are on the march, stopping here and there for a day or two at most, pits for the disposition of fecal matter are sufficient; but in permanent camps they have always been, are, and probably always will be a menace to the health of any command. While it is true that it was well-nigh impossible to construct proper sinks at Chickamauga, it must not be forgotten that in other encampments, where there was no difficulty in digging pits and where there was no scarcity of earth suitable for covering their contents, typhoid fever prevailed extensively. It has been urged by some that the great prevalence of typhoid fever at Chickamauga was due to the fact that a large number of troops were massed at one place. There is some truth in this, but at no time was the density of the soldier population at Chickamauga Park as great as that of many of our cities, in which typhoid fever is comparatively a rare disease. It cannot, therefore, properly be said that typhoid fever at Chickamauga was the result of the massing of a large number of men; at least the spread of the disease was only incidental to this. If the excretions of these men could have been carried away by means of properly constructed sewers, or if they could have been thoroughly disinfected, and if camp pollution had not been permitted, there is no reason why typhoid fever should have been more prevalent among the troops at Chickamauga in the summer of 1898 than it was in New York City. I repeat that, in my opinion, the sink must not be permitted in permanent camps. When possible water carriage for fecal matter should be secured, and when this is impracticable the thorough disinfection of all fecal matter in tubs such as have been recommended by our board to the Surgeon-General will, I believe, reduce typhoid fever in permanent encampments to a few sporadic cases.

The greatest sanitary sin committed among the troops at Chickamauga in 1898, as well as in most other national encampments, was that of camp pollution. Some of the regimental sites became most disgustingly filthy. A few extracts from the stenographic notes taken

at the time of our inspection of the troops at Chickamauga illustrate this point. "In the camp of the Third United States Volunteer Cavalry we found the sinks full to the top with fecal matter, soiled paper was scattered about the pits, and the woods behind the regimental camp were strewn with fecal matter. The Second Kentucky Volunteer Infantry was located in the woods; fecal matter was deposited around trees and flies swarmed over these deposits, not more than one hundred and fifty feet from the company mess-tents; the odor in the woods just outside of the regimental lines was vile. In the Ninth New York we found three battalion sinks supposed to have been filled with straw and burned out that morning. Fecal matter was seen deposited on the ground around the trees, and the odor of the same permeated the air about the sinks. In the hospital of the Third Division of the First Army Corps, we found that the stools were not disinfected at all. The bedpans were washed in water, but were not disinfected. The excreta of attendants were received in galvanized iron boxes of very imperfect pattern. There was abundant opportunity for the outside of the boxes to become foul and no means were provided for properly handling these boxes."

Local conditions in different parts of this great encampment varied considerably. Though the Second Division of the First Army Corps did not at any time take drinking-water from Chickamauga Creek, it is probable that an infected water-supply was one of the agents of the spread of typhoid fever through this division. When the regiments of this organization arrived at the Park, they were encamped about two wells and for some time obtained their drinking-water from these sources. Up to that time there had been nothing about the wells likely to infect their contents. Indeed, it can be quite positively stated that the water of these wells had not been infected with typhoid fever before the troops arrived. There were but few people in the Park, and the workingmen employed in making roads had used the water continuously for years, and General Boynton assured us that none of these workingmen had ever developed typhoid fever.

At Jay's Mill is a dug well, walled up with rock, located in a low place in the road, which receives the drainage from the higher ground by which it is surrounded. In May and June, 1898, the six regiments constituting the First and Second Brigades of the

Second Division of the First Army Corps were located about this well. All of these commands with the exception of the One Hundred and Sixtieth Indiana had during this time one or more cases of typhoid fever, which were cared for in the regimental hospitals. It is more than probable that every latrine in these two brigades became infected with typhoid fever during the month of June. When heavy rains fell, the water flowed down from the elevated camp-sites, filled Jay's Mill well and accumulated about it, forming a pond two or three feet deep. I will add the testimony of officers who were present at the time and were observers of the conditions which they described.

Major Hysel, Surgeon of this Division, testified as follows: "I reached Chickamauga Park, June 7, 1898. Some time during the last week of June I went to the camp of the Thirty-first Michigan Volunteer Infantry, and found in the regimental hospital of that command two cases of typhoid fever. I began an investigation to find, if possible, the sources of infection in these cases. The colonel of the regiment told me that he believed the disease was due to impure water obtained from Jay's Mill well. I immediately went to examine this well, and after seeing it I was convinced that the water in it might be contaminated. I had the pump pulled out in order to prevent further use of this water. But from this time on there was more or less typhoid fever in the Thirty-first Michigan Volunteer Infantry."

Lieutenant-Colonel Shubel made the following statement: "We had great trouble while on this site in digging our sinks; we wrecked many shovels and picks in our attempts to dig them, and the results attained were not satisfactory. Jay's Mill well is in a kind of swale in the road, and all the overflow from the sinks above collected around this well and only the pump projected above the water, which had run down from the more elevated camp-sites."

Captain Smith, of the Thirty-first Michigan, testified: "From my experience as officer of the day, I can say that the water would sometimes get so deep around this well that one could only see the top of the pump. I have seen the water standing three feet deep for some distance around the well."

With the conditions as here described, it would hardly seem possible that the water of this well could escape infection with the specific germ of typhoid fever.

Tents were allowed to stand in the same spot too long and were not opened and aired sufficiently often. In his testimony before our board, Major Harland, Surgeon of the First Pennsylvania Volunteer Infantry, stated that the tents of this command while at Chickamauga became very filthy, that they were not opened and their contents were not exposed to the sun daily, and that he frequently observed mould and fungi growing in the tents. He strongly urged a change of location, and finally the tents were shifted from the woods into the adjoining open space.

The following statement was formulated by Major Stayer, of the Fifth Pennsylvania Volunteer Infantry, in his August report. "This disease was largely due to the unhealthy location of the camp near Alexandria bridge. This camp was in a deep shade; it was very low and flat and had no natural drainage, so that the slightest moisture kept the streets continuously muddy. The latrines and kitchen-sinks had to be dug in clay, which is absolutely devoid of porosity. This camp received the surface water of the Twelfth Minnesota Volunteer Infantry, which was located south of and above our camp. I made verbal objection to the occupation of the first camp-site upon my arrival May 20, 1898. Moreover, every few days, I recommended the removal of the camp, and, while acting as surgeon of the regiment, I made recommendation for its removal July 11 and 12."

In his report to the Surgeon-General on the sanitary condition of Camp Thomas, August 7, 1898, Lieutenant-Colonel Woodhull states: "In the Fifth Pennsylvania the camp-site was lower than the sinks. Owing to recent rains, the sinks overflowed and flooded the camp. The sick report of this regiment was eleven per cent., including twenty-five cases of recognized typhoid fever and fifteen supposed to be of that disease, with the sick-rate increasing."

Captain Beamer, of the First Mississippi, speaks of the location of this regiment at Chickamauga as follows: "Our camp was situated just below the Third Tennessee and to the rear of the Fifty-second Iowa. All the filth from the Third Tennessee washed down into our camp and it was impossible to keep it in good condition. At first we obtained our drinking-water from a spring about three-quarters of a mile from camp. Later our camp was moved nearer to this spring. This site was all right until it rained, when it was found that we were located in a swamp. The ground became

very muddy, and, as there were no floors in the tents, the men were compelled to sleep on the wet ground. Finally we moved out on to a hill, into the open air, and at this place we had a nice camp. The flies were very numerous. I think that the spring from which we obtained our water was contaminated."

I might easily give additional evidence of the fact that the soil and water at Chickamauga Park became grossly contaminated, and that matter specifically infected with the typhoid germ was widely disseminated; but the statements already given must suffice.

The following table gives the name of each regiment of the First and Third Army Corps, the date of its arrival at Chickamauga, and the dates of the first cases of probable and recognized typhoid fever.

FIRST ARMY CORPS.

FIRST DIVISION.

	Arrived at Chickamauga.	Date of first case of probable ty- phoid fever.	Date of first case of recognized ty- phoid fever.
FIRST BRIGADE.			
1st Kentucky ¹	June 11	June 19	June 28
8d Wisconsin ¹	May 15	May 24	May 28
5th Illinois	May 17	May 16	May 16
SECOND BRIGADE.			
4th Ohio ¹	May 16	May 17	July 16
8d Illinois ¹	May 17	May 17	June 28
4th Pennsylvania ¹	May 16	June 1	June 1
THIRD BRIGADE.			
16th Pennsylvania ¹	May 17	May 8	June 20
2d Wisconsin ¹	May 17	May 11	June 16
8d Kentucky	June 2	June 9	June 21

¹ These regiments went to Porto Rico in July.

SECOND DIVISION.

FIRST BRIGADE.			
81st Michigan	May 17	June 1	June 1
160th Indiana	May 17	July 4	July 7
1st Georgia	June 17	June 6	June 6
SECOND BRIGADE.			
158th Indiana	May 18	June 6	June 24
6th Ohio	May 18	May 18	May 18
1st West Virginia	May 20	June 6	June 16
THIRD BRIGADE.			
1st Pennsylvania	May 17	May 12	May 12
14th Minnesota	May 18	May 27	June 3
2d Ohio	May 18	May 20	June 22

FIRST ARMY CORPS—Continued.

THIRD DIVISION.

	Arrived at Chickamauga.	Date of first case of probable ty- phoid fever.	Date of first case of recognized ty- phoid fever.
FIRST BRIGADE.			
5th Pennsylvania	May 20	May 19	May 19
12th Minnesota	May 20	May 20	June 1
1st South Carolina	June 7	June 9	June 9
SECOND BRIGADE.			
8th Massachusetts	May 20	May 28	July 24
21st Kansas	May 20	May 21	May 21
12th New York	May 20	June 6	July 3
THIRD BRIGADE.			
2d Missouri	May 20	May 26	May 27
1st New Hampshire	May 22	May 24	June 4
9th Pennsylvania	May 20	May 31	June 14

THIRD ARMY CORPS.

FIRST BRIGADE.		FIRST DIVISION.	
14th New York	May 20	May 23	June 12
1st Missouri	May 21	May 31	June 28
5th Maryland ¹	May 21	June 25	June 25
SECOND BRIGADE.			
2d Nebraska	May 22	May 26	June 30
2d New York ²	May 21	June 1	June 11
1st District of Columbia ³ . .	May 28	May 25	May 25
THIRD BRIGADE.			
3d Tennessee	May 24	June 9	June 16
1st Vermont.	May 24	May 26	June 26
8th New York	May 25	June 24	June 24

¹ Left Chickamauga June 2 and were transferred to Fourth Corps.

² Transferred to Fourth Corps June 1.

³ Left June 1 and went to Cuba.

FIRST BRIGADE.		SECOND DIVISION.	
2d Kentucky	May 26	June 26	June 26
9th New York	May 26	June 10	June 13
1st Arkansas	May 27	June 2	June 5
SECOND BRIGADE.			
5th Missouri	May 27	June 6	July 2
2d Arkansas	May 30	June 4	June 15
69th New York ⁴	May 27	June 12	June 23
THIRD BRIGADE.			
1st Maine	May 30	June 25	June 27
52d Iowa	May 31	June 8	June 8
1st Mississippi	May 31	June 1	June 1

⁴ This regiment left Chickamauga Park June 2 and reached Tampa, Florida, June 6.

THIRD ARMY CORPS—*Continued.*

CAVALRY BRIGADE.

	Arrived at Chickamauga.	Date of first case of probable ty- phoid fever.	Date of first case of recognized ty- phoid fever.
8d United States V. C.	May 30	June 15	June 23
1st Illinois V. C.	June 1	June 10	June 20
1st Ohio V. C. ¹	May 15	May 20	July 4

¹ Transferred to Fourth Corps July 13.

Of the forty-eight regiments which constituted the First and Third Army Corps, four reached Chickamauga Park with developed, recognized cases of typhoid fever, and five others arrived with cases of illness otherwise diagnosed, but whose subsequent history renders it quite certain that they were cases of this disease. These I have designated as probable typhoid, and this meaning may be attached to this designation wherever found in this article. Five regiments developed recognized typhoid fever during the first week of their stay at Chickamauga, and eleven others had probable cases of this disease. Twelve regiments developed typhoid fever during the second week after arrival, although the nature of the ailment was recognized in only three of these, and at the expiration of one month after arrival only two of the forty-eight regiments were free from this disease.

As the period of incubation in typhoid fever extends from one to three weeks and possibly longer, it is safe to say that ninety per cent. of the regiments constituting the First and Third Army Corps reached the national encampment bringing with them this disease. So widely distributed is this malady that it can generally be assumed, when the men of a regiment of volunteers are brought together from different parts of a State, that there will be found one or more persons infected with its specific bacillus. A single individual thus infected may distribute the germs of this disease in every latrine in a regimental camp before he himself recognizes that he is sick. It is for this reason that armies have always carried typhoid fever wherever they have gone. When the Franco-German war began, every corps of the German Army was infected with typhoid fever, and within less than two months after war was proclaimed, this disease had extended so widely among certain divisions that more than fifteen per cent. of the men in these commands were sick with it. The total number of cases developed among

under officers and men in the German Army during this war amounted to seventy-three thousand three hundred and ninety-six, equivalent to 9.31 per cent. of the average strength. During the invasion of Afghanistan by the English from 1878 to 1880, the invading army encamped in places probably never before occupied by human beings. It is not at all likely that the water, which was obtained from mountain streams, was specifically contaminated with the virus of typhoid fever, nor is it probable that the virgin soil covered by these encampments was infected, except as it became so by occupation, and yet typhoid fever occurred at every station from the Indian frontier to Kabul and Kandahar. A similar experience is furnished by the history of French expeditions in Northern Africa. In the Oran Campaign in 1885, French commands encamped in desert stations never before occupied, and in these typhoid fever not only appeared but acquired epidemic proportions. In the Suakim expedition of 1885, all the drinking-water was distilled, and yet typhoid fever prevailed extensively. This disease followed the two regiments sent for the relief of Chitral in 1895. Every English expedition in South Africa has had a similar experience, and there is no reason for believing that the war now in progress in that region will prove an exception to the rule.

With typhoid fever introduced as above stated and its specific bacillus widely scattered over the surface of the ground and deposited in sinks, its spread among the troops at Chickamauga naturally resulted. I have already spoken of the possible contamination of certain sources of water-supply, but I am satisfied that there were other means by which this germ was disseminated.

There can be no reasonable doubt that one of the most active agents in the spread of typhoid fever in this and other encampments in the summer of 1898 was the fly. The reasons for coming to this conclusion may be summed up as follows:

- (1) The latrines contained fecal matter specifically infected with the typhoid bacillus.

- (2) Flies alternately visited and fed upon this infected fecal matter and the food in the mess-tents. More than once it happened, when lime had been scattered over the contents of the pits, that flies with their feet covered with lime were seen walking over the food.

- (3) Typhoid fever was much less frequent among members of

messes who had their mess-tents screened than it was among those who took no such precaution.

(4) In the fall of 1898 typhoid fever gradually died out in most of the encampments with the disappearance of the flies, and this occurred at a time of the year when in civil practice the disease is generally on the increase. In considering this point, I will follow one of the divisions of the First Army Corps to its second encampment at Knoxville. Most of the regiments at this place came from Chickamauga, where they had become seriously infected with typhoid fever. The specific germ of this disease was carried from Chickamauga to Knoxville in the bodies of the men, on their persons, in their clothing, in their blankets, and in their tents. Within twenty-four hours after the arrival of the troops, the pits at Knoxville contained fecal matter infected with the typhoid bacillus. Flies swarmed everywhere. Instead of abating, the epidemic increased. The soldiers were using water from the same source as that used by the inhabitants of West Knoxville, and among the latter there was not at that time a case of typhoid fever. Certainly the disease was not disseminated at this place through the drinking-water. The locations of the regimental camps were ideal. The ground had never been occupied by troops before, consequently was not polluted; but, as has been stated, typhoid fever continued to increase until the cooler weather of October lessened the number of flies, when the epidemic abated.

It has been suggested that the disease gradually disappeared among these troops because all the susceptible material had been used up. Fortunately, a definite answer can be given to this suggestion. The division which went to Knoxville received several regiments of recently recruited troops, that had not been at Chickamauga. These regiments arrived early in September; they were soon infected with typhoid fever, but the disease disappeared among these new commands simultaneously with its disappearance among the older troops. It cannot be said that the abatement of the disease among these recently recruited regiments was due to exhaustion of susceptible material.

Flies may carry infected matter from the persons of those sick with the disease and deposit it in the drink or on the food of the healthy. To those who have seen flies feeding upon the fecal matter smeared over the buttocks of patients or have seen them crawling

into the mouths of the unconscious typhoid subject, nothing more is necessary than to mention this possible means of the dissemination of the disease. When flies abound, men sick with typhoid fever should be protected from the annoyance of this insect, not only because the patient will be more comfortable, but also because this protection is desirable in order to prevent the spread of the disease through the agency of these pests.

Flies may carry the infected material from soiled clothing or bedding and deposit it upon food. Near the rear end of one of the regimental hospitals inspected by us at Knoxville, we found half a dozen or more bedpans more or less soiled with undisinfected stools swarming with flies, which may have visited the mess-tents later. No undisinfected material should be left exposed to flies.

The specific virus of typhoid fever was undoubtedly frequently transported on the person or in the clothing. At one of the division hospitals at Camp Alger in August, 1898, the members of our board saw nurses go directly from their duties in the typhoid wards to their mess-tents and handle the food eaten by themselves and pass articles to their neighbors without even washing their hands. Another practice, for which superior officers were responsible, is undoubtedly accountable to some extent for the spread of typhoid fever among the soldiers at the various encampments. It was customary in some of the commands to take a fresh detail of men from the line each day as orderlies at the hospital. Each morning one hundred men were detailed to attend those sick with typhoid fever, to place and adjust bedpans, and to carry their contents to the sinks and disinfect them. These men, at least the majority of them, were wholly ignorant of the nature of infection; they had never had any training as nurses; they knew nothing about the desirability or necessity of being careful in order to prevent infecting themselves, and they knew less about the means of disinfecting their hands when soiled with typhoid discharges. At the close of the day these men returned to their company tents, and the next morning a new detail of the same number went through a similar routine. A more effective means for the spread of typhoid fever could scarcely have been devised.

I do not think that we can deny that, in military life at least, typhoid fever is often disseminated through the air. So prevalent was this disease at Chickamauga that much of the fecal matter

scattered over the soil must have contained the Eberth bacillus, and it seems hardly possible that the great clouds of dust in which the men sometimes lived could have been free from this infection. Particles of this dust must have been deposited upon the food exposed on the mess-tables. Local whirlwinds sometimes caught up large quantities of dust and carried it considerable distances. After seeing these things, I cannot exclude the dust as a possible carrier of the typhoid infection, though it would probably be very difficult to prove scientifically that the disease was disseminated in this way.

To sum up my statements so far, I may say that typhoid fever was brought to Chickamauga by one or more infected men in nearly every regiment. The specific bacillus of this disease was deposited along with the fecal matter of these persons on the ground and in the latrines. It occasionally found its way into the drinking-water. Colonies of the bacillus were probably carried in clouds of dust and possibly deposited upon food or inhaled by the men. Flies swarmed over infected fecal matter in latrines and on the surface, and then walked over meat, potatoes, and bread on the mess-tables. Unskilled nurses soiled their hands with the dejections of the sick, and later transferred this infected material to their own mouths and possibly handed it on to their comrades. Clothing, blankets, and tentage became infected.

With the conditions as already described, it will be interesting to ascertain to what extent typhoid fever did appear among the soldiers of the First and Third Army Corps. This inquiry is answered by the following figures:

The total number of troops in the First and Third Army Corps for which statistics concerning typhoid fever have been collected was	44,803
The total number of cases of probable typhoid fever among these troops was	9660
The percentage of probable typhoid fever among these troops was	21.56
The total number of deaths from typhoid fever among these troops was	718
The percentage of deaths among probable cases of typhoid fever among these troops was	7.38
The total number of cases of recognized typhoid fever among these troops was	4068
The percentage of deaths among recognized cases of typhoid fever among these troops was	17.52

In the above table is one statement which without proper explanation might not be understood. I have given the percentage of deaths among recognized cases of typhoid fever, and this is not strictly correct, because all the deaths from typhoid fever did not occur among recognized cases of this disease. It may be of interest to inquire how the regimental and hospital surgeons diagnosed the cases which terminated fatally from typhoid fever. A considerable number of the deaths reported in each regiment occurred after the patients had reached their homes on furlough. Most of the men thus furloughed are recorded in the regimental and hospital reports as having malaria or they were sent home without any definite diagnosis of their disease. Taking the 713 deaths from typhoid fever as given in the table, the recorded diagnoses of these cases by regimental and hospital surgeons were as follows:

Typhoid fever	390
Malaria	144
Undiagnosed or undetermined fever	141
Diarrhœa	22
Dysentery	9
Indigestion	4
Gastritis	1
Enteritis	1
Pneumonia	1
Total	713

It will be seen from these figures that among 4068 cases of recognized typhoid fever there were 390 deaths; while of 5592 cases otherwise diagnosed, and for the most part furloughed, 323 died of typhoid fever. A true statement would show that the percentage of deaths among the 4068 cases of recognized typhoid fever was 9.58, and among the 5592 cases of probable typhoid fever it was 5.77.

Out of the 713 deaths from typhoid fever, 352 occurred in some army hospital, 315 occurred elsewhere, principally at the homes of the men, and in 45 cases we have not been able to ascertain the place of death. These figures show that the general order permitting medical officers to send sick men home on furlough was not abused. The number of malingerers must have been very small. This is in accord with the opinion of army medical officers at Chickamauga at the time. Frequently the statement was made that it was difficult to induce men to accept furloughs until they became too sick

to travel. All those who saw the sick returning from Chickamauga and other camps during the fall of 1898 must have been convinced by the appearance of these furloughed soldiers that they were in reality sick. The figures which I have given confirm this impression.

The statements just made indicate that the average medical officer in the volunteer army in 1898 did not recognize half of the cases of typhoid fever which came under his observation. From this it has been inferred that most of the men who went into the volunteer medical service were inferior to the average practitioner. This inference is by no means justified; after personal inspection of nearly every regiment in the volunteer service except those that went to Manila, it is my belief that the average medical officer in 1898 not only was far superior to the average doctor the country over, but was more than the equal of the average physician in our large cities. It is true that he allowed more than one-half of his cases of typhoid fever to pass through his service without properly diagnosing them; but the average practitioner in civil practice is doing far worse than this, as the following will, I think, prove.

To ascertain what proportion of his typhoid patients the physician in civil practice incorrectly diagnoses, it will be necessary to gather some facts concerning the death-rate from this disease. It is well known that since typhoid fever has been recognized as distinct from typhus fever the death-rate from this disease has gradually decreased. This decrease in death-rate is undoubtedly due to at least two causes. In the first place, the diagnosis is much more easy than it was formerly, when typhus fever was so prevalent; in the second place, the methods of treatment have greatly improved. Murchison reported 2505 cases that occurred in the London Fever Hospital from 1848 to 1862, with a death-rate of 18.5 per cent.; Griesinger collected 18,612 cases from the hospitals of London, Glasgow, Paris, and Strasburg from 1840 to 1865, and found that these showed a death-rate of 18.52 per cent.; in the old hospital in Vienna from 1846 to 1861 there were 21,189 cases, with a death-rate of 22.2 per cent.; in the Jacobs Hospital in Leipsic from 1880 to 1893 there were 1626 cases, with a death-rate of 12.7 per cent.; in the city of Hamburg during the years 1886 and 1887 there were 10,823 cases, with a death-rate of 8.5 per cent.; in 1897 there were 1885 cases at Maidstone, England, with a death-rate of 7.5 per cent.

Brand has collected 19,017 cases treated by cold baths, with a mortality of 7.8 per cent.

All the above figures have been obtained from European sources, and many of them refer to epidemics somewhat remote in time. To ascertain the mortality from typhoid fever in this country and at this time, I sent a request to the superintendents of several of the largest hospitals in the United States asking for the number of cases of typhoid fever treated in the years 1896 and 1897 and the number of deaths in each of these years. I did not ask for cases in 1898, because I wished to avoid cases among soldiers. The following figures were obtained in response to this request.

DEATH-RATE FROM TYPHOID FEVER IN SOME OF THE LARGER HOSPITALS IN THE UNITED STATES.

NAME OF HOSPITAL.	No. of Cases.		Deaths.		Total Cases in 1896 and 1897.	Total Deaths in 1896 and 1897.	Percentage of Deaths.
	1896	1897	1896	1897			
City Hospital, Boston, Mass.	437	399	44	46	836	90	10.76
Massachusetts General Hospital, Boston, Mass.	151	100	16	8	251	24	9.56
Episcopal Hospital, Philadelphia, Pa.	153	141	18	10	294	28	7.82
University Hospital, Philadelphia, Pa.	20	36	1	3	56	4	7.14
German Hospital, Philadelphia, Pa.	64	153	7	10	217	17	7.83
Johns Hopkins Hospital, Baltimore, Md.	110	116	11	8	226	14	6.19
St. Luke's Hospital, New York, N. Y.	32	34	1	0	66	1	1.51
Bellevue Hospital, New York, N. Y.	72	76	11	11	148	22	14.86
Mt. Sinai Hospital, New York, N. Y.	105	94	8	9	199	17	8.54

Total number of cases of typhoid fever in these hospitals	2293
Total number of deaths among the cases treated in these hospitals	212
Percentage of deaths among these cases	9.24

It will be seen from these figures that the average death-rate from typhoid fever in the large hospitals in this country is a little more than nine per cent. Bearing in mind that the lighter cases of this disease are not carried to hospitals and that the hospital records embrace all ages and conditions of life, while the soldiers were men selected on account of physical perfection, it must be admitted that a death-rate of 7.38 per cent. among the 9660 probable cases at Chickamauga was not an unusually low one.

To ascertain the death-rate from typhoid fever in general practice in some of the larger cities of the Union, I directed a letter to the health commissioner of each of these cities. Most of these individuals replied that they were unable to give anything more than deaths, inasmuch as cases of typhoid fever are not reported to the health authorities. However, from a few cities returns have been furnished me. In my opinion, these figures are worthless so far as information concerning the death-rate in typhoid fever is concerned, but they are valuable in showing that the average physician in civil practice does not recognize and does not report typhoid fever.

DEATH-RATE FROM TYPHOID FEVER IN CERTAIN CITIES IN THE UNITED STATES.

Name of City.	Year.	No. of Cases.	No. of Deaths.	Percentage of Deaths.
Buffalo, N. Y.	1894	1088	185	17.
Buffalo, N. Y.	1895	397	98	24.68
Buffalo, N. Y.	1896	274	68	24.81
Buffalo, N. Y.	1897	201	63	31.34
Buffalo, N. Y.	1898	280	98	35.
Albany, N. Y.	1896	438	97	22.14
Albany, N. Y.	1897	440	84	19.09
Minneapolis, Minn.	1896	435	60	13.79
Minneapolis, Minn.	1897	1534	148	9.64
Pittsburg, Pa.	1896	1216	175	14.39
Pittsburg, Pa.	1897	1284	184	14.33
Cleveland, Ohio	1896	296	142	47.97
Cleveland, Ohio	1897	256	78	28.51
Richmond, Va.	1896	51	9	17.64
Richmond, Va.	1897	78	7	8.97
Duluth, Minn.	1896	785	102	12.99
Duluth, Minn.	1897	857	33	9.24
St. Louis, Mo.	1896	348	106	30.45
St. Louis, Mo.	1897	433	124	28.63
Philadelphia, Pa.	1896	2490	402	16.14
Philadelphia, Pa.	1897	2994	401	13.38
New York, N. Y.	1896	1004	297	29.64
New York, N. Y.	1897	1004	299	29.78

Total number of cases of typhoid fever reported in the above-mentioned cities in 1896 and 1897 17,683

Total number of deaths among the cases reported in the above-mentioned cities in 1896 and 1897 3255

Percentage of deaths among reported cases in the above-mentioned cities 18.31

What information can we gain from these figures? Are we to infer that the death-rate from typhoid fever in general practice in

our large cities is 18.31 per cent., while in our hospitals, to which, as a rule, the graver cases are sent, it is only 9.24? Are we to conclude that the mortality in cases of typhoid fever is nearly 30 per cent. in New York, while it is only 8.5 per cent. in Hamburg? Can it be true that typhoid fever is a more fatal disease in general practice in the large cities in the United States than it ever was in London, Paris, or Vienna? We need not frighten ourselves with these questions. There is only one interpretation to be placed on the figures in the above table, and that is that the physicians in the cities therein named do not recognize the cases of typhoid fever that pass through their service.

Supposing that typhoid fever in New York City is no more deadly than it was among the soldiers at Chickamauga, it follows that, while the army surgeon diagnosed properly one-half of the cases of typhoid fever that passed under his observation, the physicians of New York City recognize only one-fourth of the cases of this disease. The truth of the matter is that the army surgeon did in his military service just as he was in the habit of doing in civil practice; that is, he failed to diagnose properly the milder cases of typhoid fever.

Having learned how typhoid fever was carried to Chickamauga, in what manner it was spread, and to what extent it prevailed, I will now give a brief statement of the provisions made for the care of the sick. Unfortunately, those who were taken ill during the first few weeks after the arrival of the commands at the encampment had to be cared for in regimental hospitals, as the division hospitals were not in readiness. This was a grave mistake. In every encampment intended to be at all permanent, hospitals should be located, equipped, and ready for service when troops arrive. It would have been better had the volunteer commands been held at State encampments until Chickamauga Park had been prepared for the assemblage of so large a number of men. Indeed, it would be a wise thing for the government to keep in constant readiness an encampment, where one hundred thousand men might be brought together within a few weeks without the danger of developing an epidemic. Without such provision we are sure to repeat the experience of 1898, should we ever, unfortunately, be called upon speedily to assemble, organize, and equip an army. It was while all cases of typhoid fever were cared for in regimental hospitals that the seeds

of the disease became so widely scattered. It was intended that when the division hospitals were opened the regimental hospitals should disappear, except as places for the temporary care of the sick until the nature of their diseases could be determined. Orders were issued that no sick man should be kept in the regimental hospital longer than two days, after which time he was to be sent to the division hospital. Notwithstanding this order, certain regiments persisted in maintaining their regimental hospitals. Most of these were inadequately supplied and unskillfully managed. Every regimental hospital in which patients were kept for a longer period than was allowed by the order was a menace to the health of the command. In one we found a steward in charge, who told us that the fever cases were at first malarial. He came to this conclusion because, as he stated, "The stools are at first lumpy, afterwards they get a little bilious and frothy, and then I keep my eye open for typhoid, and after a while they get more yellow and frothy, and then I begin to disinfect them." In another regimental hospital the steward in charge assured us that he was disinfecting the discharges with a fifteen-per-cent. solution of carbolic acid. When asked how he prepared this solution, he replied that he added one drachm of carbolic acid to one hundred and forty-four drachms of water. In another we found the contract surgeon in charge using copperas as a disinfectant. It should be plainly understood that the regular army medical service was not responsible for the condition of these regimental hospitals, as they existed in defiance of the rules and regulations.

Lieutenant-Colonel Woodhull inspected the division hospitals at Chickamauga in August, 1898, and reported their condition to the Surgeon-General. Concerning the hospital of the First Division of the Third Army Corps, he stated in part as follows: "The tents are too crowded, containing eight patients apiece, and they have had ten. There is insufficient space between the wards, the grounds are not adequately ditched, and the approach to patients' sinks is very poor. The sinks themselves are very bad. The hospital is not divided into brigades. The Red Cross supplies about one-half of the clothing and bedding. The floors, however, supplied the tents were furnished by regimental means. The hospital fund started with fifty dollars and there were forty-eight dollars at the end of the month, but considerable expenditures had been met

by emergency funds supplied by the regiments. Very serious complaints are made as to the inadequacy of the medical supplies. No atropine is on hand, and the salol has been bought by private means. The food as a whole is good and the special diet kitchen is very neat. Two of a case of twelve sides of bacon then on hand were bad, and I personally observed the maggots in them. There was only one very small coffee-mill apparently belonging to a mess-chest for the whole hospital, and one man was employed all day in grinding coffee."

None of the division hospitals at Chickamauga were properly equipped. There were two general hospitals located in the Park. These were known as the Sternberg and the Leiter Hospital. Both of these were abundantly supplied with everything desirable in the way of medical stores and with every delicacy in the way of food. The Leiter Hospital occupied a building formerly used as a hotel, while at the Sternberg Hospital patients were cared for under canvas. The last-mentioned was an ideal field hospital, and it illustrated what the medical service of the army is able to do when furnished with abundant means. Besides the hospitals already mentioned, many of the sick were sent from Chickamauga to the well-equipped military hospitals at Fort McPherson, near Atlanta, and at Fort Thomas, Kentucky.

I will conclude by answering definitely the questions asked in the beginning of this paper.

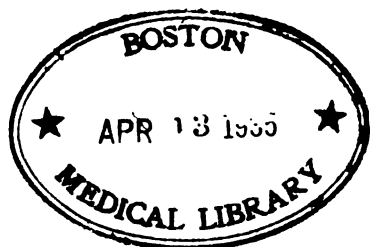
(1) The percentage of sickness and death among our soldiers who remained in this country during the late war with Spain was much higher than it should have been.

(2) The national encampments became highly unsanitary and grossly polluted.

(3) The responsibility must be divided. The men were careless. They would drink water from forbidden sources. At night they deposited fecal matter on the surface all about the regimental camps. Many of the medical officers were inexperienced and all of them were without sufficient authority to bring about improvements which they plainly saw were needed. The line officers should bear their part of the blame, which certainly was great and in direct proportion to rank. Army surgeons can recommend; superior line officers can command. I have great admiration for the officers in our regular army, but it is unfortunate that their whole training

has been directed to the means of warfare and that most of them are ignorant of the sanitation of camps and the care of the health of their men. In this respect the volunteer line officer was often especially at fault. Lastly, the most severe criticism must fall upon those congressmen who, session after session, have turned a deaf ear to reasonable and moderate requests for the better equipment of the army medical service. The war came upon us with the number of army surgeons reduced to a minimum, with the hospital corps cut down to barely two hundred, and with the medical supply depots inadequately stocked.

(4) There are imperfections in the medical service of our army which ought to be remedied. I have not the space to go into detail on this subject, and must content myself with the statement that in every army organization there should be some medical officer sufficiently versed in military hygiene to know how best to preserve the health and life of the soldier and possessed of sufficient authority to demand that his recommendations receive attention.



Therapeutics

THE PHILADELPHIA HOSPITAL FORMULARY.

BY DANIEL E. HUGHES, M.D.,

Chief Resident Physician of the Philadelphia Hospital,

AND

JOSEPH M. ENGLAND, Ph.G.,

Chief Druggist of the Philadelphia Hospital.

IN 1875 an attempt was made to collect some of the formulæ of those medicinal preparations which had proved, for one reason or another, especially valuable in the treatment of cases confined in the Philadelphia Hospital. These have been added to from time to time, and all those prescriptions have been eliminated which are to be found in the Dispensatory or the National Formulary. The prescriptions have been arranged alphabetically under general headings, the quantity of the ingredients being given in both apothecaries' weight and their approximate metric equivalents. One of the reasons why the metric system has not been more generally used is because physicians have endeavored to be too exact in changing one system into the other. The text of the formulæ has been expressed in a new system of English abbreviations, which is more accurate than the mixture of Latin and English in common use, while being equally unintelligible to the general public.

ELIXIRIA.

ELIXIR ACETANILIDI.

(The depressing action of the acetanilid is overcome by the other ingredients. Useful as an antipyretic, in congestive headaches, etc.)

Each teaspoonful contains—

Acetanilid,	2.5 gr.	0.15 Gm.
Spt. ammon. aromatic,	15 m.	1 Cc.
Tr. card. comp.,	15 m.	1 Cc.
Alcohol,	15 m.	1 Cc.
Elixir, orange, to measure	1 fl. dr.	4 Cc.

Dose.—One teaspoonful.

ELIXIR FERRI, QUININÆ, ET STRYCHNINÆ.

(The pyrophosphate of iron is much to be preferred to the phosphate. The dose is but one-half as much.)

Each teaspoonful contains—

Iron pyrophos.,	2 gr.	0.13 Gm.
Quinine hydrochlor.,	1 gr.	0.065 Gm.
Strychnine sulphate,	$\frac{1}{4}$ gr.	0.001 Gm.
Glycerin,	10 m.	0.6 Cc.
Syrup,	20 m.	1.2 Cc.
Elixir, orange, to measure	1 fl. dr.	4 Cc.

Dose.—One to two teaspoonfuls.

ELIXIR GLONOI.

(A very convenient strength when one desires to administer nitroglycerin.)

Each teaspoonful contains—
Solution, nitroglycerin (1 per cent.) 1 m., — $\frac{1}{10}$ gr. of nitroglycerin, 1 m. 0.06 Cc.
Elixir, orange, to measure 1 fl. dr. 4 Cc.
Dose.—One to two teaspoonfuls.

ELIXIR POTASSII ARSENITIS.

Each teaspoonful contains—
Sol. potass. arsenite, 2 m. — $\frac{1}{2}$ gr. of arsenious acid, with potassium bicarbonate, 2 m. 0.12 Cc.
Tr. card. comp., 5 m. 0.3 Cc.
Elixir, orange, to measure 1 fl. dr. 4 Cc.
Dose.—One to two teaspoonfuls.

ELIXIR STRYCHNINÆ ARSENATIS.

Each teaspoonful contains—
Strychnine arsenate, $\frac{1}{2}$ gr. 0.001 Gm.
Elixir, orange, to measure 1 fl. dr. 4 Cc.
Dose.—One to two teaspoonfuls.

EMULSA.

EMULSUM OLEI GAULTHERIÆ.

(For rheumatism.)

Each teaspoonful contains—
Oil, wintergreen, 15 m. 1 Cc.
Acacia, Sugar, of each, sufficient.
Water, to measure 1 fl. dr. 4 Cc.
Dose.—One-half to one teaspoonful.

EMULSUM OLEI MORRHUÆ.

Each tablespoonful contains—
Oil, cod-liver, 2 fl. dr. 8 Cc.
Oil, wintergreen, Oil, sassafras, Acacia, Sugar, of each, sufficient.
Water, to measure 4 fl. dr. 15 Cc.
Dose.—Tablespoonful.

EMULSUM OLEI MORRHUÆ CUM HYPOPHOS.

Each tablespoonful contains—
Oil, cod-liver, 1.5 fl. dr. 6 Cc.
Oil, wintergreen, Oil, sassafras, Acacia, of each, sufficient.
Syrup, hypophos., 1 fl. dr. 4 Cc.
Water, to measure 4 fl. dr. 15 Cc.
Dose.—Tablespoonful.

EMULSUM OLEI MORRHUÆ CUM HYPOPHOS., CREOSOT.

Each tablespoonful contains—
Creosote, 2 m. 0.12 Cc.
Emulsion, cod-liver oil and hypophosphite, to measure 4 fl. dr. 15 Cc.
Dose.—Tablespoonful.

EMULSUM OLEI MORRHUÆ CUM LACTOPHOS.

(Useful for children.)

Each tablespoonful contains—
Oil, cod-liver, 1.5 fl. dr. 6 Cc.
Oil, wintergreen, Oil, sassafras, Acacia, of each, sufficient.
Syr. calcium lactophos., 1 fl. dr. 4 Cc.
Water, to measure 4 fl. dr. 15 Cc.
Dose.—Tablespoonful.

EMULSUM OLEI TEREBINTHINÆ.

Each teaspoonful contains—
Oil, turpentine, 5 m. 0.3 Cc.
Acacia, Sugar, of each, sufficient.
Water, to measure 1 fl. dr. 4 Cc.
Dose.—One to two teaspoonfuls.

EMULSUM TEREBINI.

Each teaspoonful contains—
Terebene, 3 m. 0.18 Cc.
Acacia, Sugar, of each, sufficient.
Water, to measure 1 fl. dr. 4 Cc.
Dose.—One to two teaspoonfuls.

LINIMENTA.

LINIMENTUM CHLOROFORMI COMPOSITUM.

Tr. aconite, 4 fl. dr. 15 Cc.
Tr. arnica, 1 fl. oz. 30 Cc.
Water, ammonia (17.5 per cent.), 1 fl. oz. 30 Cc.
Lin. chloroform, to measure 6 fl. oz. 180 Cc.

LINIMENTUM GAULTHERIÆ COMPOSITUM.

(For articular rheumatism. Cleanse parts thoroughly, so as to remove all fat.)

Oil, gaultheria, 4 fl. dr. 15 Cc.
Alcohol, 2 fl. oz. 60 Cc.
Tr. capsicum, 4 fl. dr. 15 Cc.
Liniment, soap, to measure 6 fl. oz. 180 Cc.

LINIMENTUM TEREBINTHINÆ COMP.

Oil, turpentine, 1 fl. oz. 30 Cc.
Water, ammonia, 1 fl. oz. 30 Cc.
Liniment, soap, to measure 6 fl. oz. 180 Cc.

LIQUORES.

LIQUOR ACIDI BORICI.

(Eye wash.)

Acid, boric, 16 gr. 1 Gm.
Water, distilled, to measure 1 fl. oz. 30 Cc.

LIQUOR ACIDI CARBOLICI.

(1-40, 1-20.)

LIQUOR ANTISEPTICA ALKALINUS.

(Useful in cases where Dobell's solution is employed.)

Sodium borate, 1 dr. 4 Gm.
Sodium bicarbonate, 1 dr. 4 Gm.
Sodium salicyl., 4 gr. 0.25 Gm.
Menthol, 1 gr. 0.065 Gm.
Thymol, 1 gr. 0.065 Gm.
Glycerin, 6 fl. dr. 23 Cc.
Water, boiling, to measure 4 fl. oz. 120 Cc.
One teaspoonful to be added to two tablespoonfuls or more of water, to be used as a wash.

LIQUOR ANTISEPTICUS.

An antiseptic solution containing—
Menthol, thymol, sodium benzo-borate, and the essential principles of gaultheria and eucalyptus, in aqueous solution, with 25 per cent. by volume of alcohol.

LIQUOR HYDRARGYRI CHLORIDI CORROSIVI.

(1-2000, 1-1500, 1-1000.)

LIQUOR HYDRARGYRI CHLORIDI CORRO-SIVI FORTIOR (1-8).

(Makes a useful preparation for a 1 to 1000 solution. One teaspoonful added to one pint of water yields a 1-1000 solution of corrosive mercuric chloride.)

Mercuric chloride, cor.,	6 dr.	24 Gm.
Ammon. chloride,	4 dr.	16 Gm.
Water, distilled, to measure	6 fl. oz.	180 Cc.

LIQUOR LITHII BROMIDI.

(A valuable preparation for the insane, especially when renal complications are present.)

Each teaspoonful contains—		
Lithium bromide	7.5 gr.	0.5 Gm.
Solution, potass. citrat.,	30 m.	2 Cc.
Water, peppermint to measure	1 fl. dr.	4 Cc.

Dose.—One to four teaspoonfuls.

LIQUOR POTASSII PERMANGANATIS.

Potassium permanganate,	3 dr.	12 Gm.
Water, distilled, boiling, to measure	6 fl. oz.	180 Cc.

One teaspoonful added to one pint of water yields a 1-2000 solution of potassium permanganate.

LIQUOR SODII PHOSPHATIS.

Each teaspoonful represents about 60 grains (4 Gm.) of crystallized sodium phosphate and 15 grains (1 Gm.) of 50 per cent. phosphoric acid, in water.

Dose.—One to two teaspoonfuls in a wineglassful or more of water, preferably hot, three times a day, one hour before meals.

LIQUOR STRONTII BROMIDI.

(The taste of the strontium bromide is disguised to a large extent.)

Each teaspoonful contains—		
Strontium bromide,	7.5 gr.	0.5 Gm.
Water, chloroform,	30 m.	1.8 Cc.
Water, bitter almond, to measure	1 fl. dr.	4 Cc.

Dose.—One to four teaspoonfuls.

LOTIONES.**LOTIO PLUMBI ET OPII.**

(Lead Water and Laudanum.)

Tr. opium, 3 fl. dr.—1 fl. oz.	12 Cc.—	30 Cc.
Water, lead, to measure	6 fl. oz.—1 pt.	180 Cc.—475 Cc.

P. H.

MISTURÆ.**MISTURA ADSTRINGENS.**

(A very valuable astringent in serous diarrhoeas.)

Each tablespoonful contains—		
Extract, logwood,	10 gr.	0.6 Gm.
Ac. sulph., aromat.,	10 m.	0.6 Cc.
Tr. opium, camph.,	20 m.	1.2 Cc.
Water, cinnamon,		
Syrup, ginger, of each, to measure	4 fl. dr.	15 Cc.

Dose.—Tablespoonful.

MISTURA ALTERANS COMPOSITUS.

(A vegetable alternative in specific diseases, catarrhal conditions of the mucosa, etc.)

Each teaspoonful contains—		
Tr. prickly ash,	10 m.	0.6 Cc.
Ext. lappa minor, fl.,	15 m.	1 Cc.
Ext. phytolacca, fl.,	15 m.	1 Cc.
Ext. stillingia, fl.,	15 m.	1 Cc.
Ext. sarsap., comp., fl., to measure	1 fl. dr.	4 Cc.

Dose.—Teaspoonful.

MISTURA ARGENTI COMPOSITA.

Each teaspoonful contains—

Silver nitrate,	½ gr.	0.004 Gm.
Water, chloroform, to measure	1 fl. dr.	4 Cc.

Dose.—One teaspoonful.

MISTURA AMMONII CARBONATIS.

Each dessertspoonful contains—

Ammon. carbonate,	5 gr.	0.32 Gm.
Mucilage, acacia,	30 m.	6 Cc.
Oil, gaultheria,	½ drop.	0.08 Cc.
Oil, sassafras,	½ drop.	0.08 Cc.

Water, peppermint, to measure 2 fl. dr. 8 Cc.

Dose.—Dessertspoonful to tablespoonful.

MISTURA AMMONII CHLORIDI ET STRYCHNINÆ.

(Increases the elimination of urea. Not an agreeable preparation to take, owing to its bad taste.)

Each teaspoonful contains—

Ammonium chloride,	5 gr.	0.32 Gm.
Strychnine sulphate,	½ gr.	0.002 Gm.
Water, chloroform, to measure	1 fl. dr.	4 Cc.

Dose.—One to two teaspoonfuls.

MISTURA BROMIDORUM.

Each teaspoonful contains—

Sodium bromide,	2.5 gr.	0.15 Gm.
Ammon. bromide,	2.5 gr.	0.15 Gm.
Potass. bromide,	5 gr.	0.32 Gm.
Syrup, ginger,	15 m.	1 Cc.
Water, to measure	1 fl. dr.	4 Cc.

Dose.—One to four teaspoonfuls.

MISTURA BROMIDORUM ET ARSENICI.

(Epileptic Mixture.)

Each teaspoonful contains—

Potass. bromide,	7.5 gr.	0.5 Gm.
Sodium bromide,	7.5 gr.	0.5 Gm.
Sol. potass. arsenite,	1 m.	0.06 Cc.
Water, peppermint,	10 m.	0.6 Cc.

Inf. gent., comp., to measure 1 fl. dr. 4 Cc.

Dose.—One to two teaspoonfuls.

MISTURA CAMPHORÆ.

(This is the original formula of Hope's Mixture. Use nitrous, not nitric acid.)

Each tablespoonful contains—

Tr. opium, deod.,	5 m.	0.3 Cc.
Acid, nitrous, fuming,	4 m.	0.24 Cc.
Water, camphor, to measure	4 fl. dr.	15 Cc.

Dose.—Tablespoonful.

MISTURA CARDIACA.

Each teaspoonful contains—

Solution, nitroglycerin (1 per cent.),	1 m.	0.06 Cc.
Tr. belladonna,	1 m.	0.06 Cc.
Tr. digitalis,	5 m.	0.3 Cc.
Tr. strophanthus,	2 m.	0.12 Cc.

Water, chloroform, to measure 1 fl. dr. 4 Cc.

Dose.—Teaspoonful.

J. M. Da Costa.

MISTURA CASCARÆ.

Each teaspoonful contains—

Ext. cascara sag., fl.,		
Inf. sarsap., comp.,		
Glycerin, of each,	20 m.	1.25 Cc.

Dose.—One teaspoonful or more, in water.

MISTURA CODEINÆ ET CHLOROFORMI.
(C-C. Mixture. Allays the cough of phthisis.)

Each teaspoonful contains—		
Codeine sulphate,	$\frac{1}{8}$ gr.	0.008 Gm.
Acid, hydrocyanic, dilute,	1.5 m.	0.1 Cc.
Spts. chloroform,	15 m.	1 Cc.
Glycerin,	10 m.	0.65 Cc.
Ext. wild cherry, fl.,	5 m.	0.3 Cc.
Elixir, orange, to measure	60 m.	4 Cc.
Dose.—Teaspoonful, in water.		

J. W. E.

MISTURA CREOSOTI.

Each dessertspoonful contains—		
Creosote, beechwood,	2 m.	0.12 Cc.
Glycerin,	30 m.	2 Cc.
Elixir, orange,	30 m.	2 Cc.
Alcohol,	30 m.	2 Cc.
Oil, almonds, bitter,	$\frac{1}{2}$ drop.	0.015 Cc.
Tr. cardamom, comp., to measure	2 fl. dr.	8 Cc.
Dose.—Two to four teaspoonfuls three to five times a day.		

MISTURA DIURETICA.

Each dessertspoonful contains—		
Potass. citrate,	10 gr.	0.6 Gm.
Potass. acetate,	10 gr.	0.6 Gm.
Spts. ether, nitrous,	15 m.	1 Cc.
Sol. ammon. acet.,	1 fl. dr.	4 Cc.
Syrup, acid, citric, to measure	2 fl. dr.	8 Cc.
Dose.—Dessertspoonful.		

MISTURA DIURETICA CUM DIGITALE.

Each dessertspoonful contains—		
Potass. citrate,	10 gr.	0.6 Gm.
Potass. acet.,	10 gr.	0.6 Gm.
Spts. ether, nit.,	15 m.	1 Cc.
Sol. ammon., acet.,	1 fl. dr.	4 Cc.
Tr. digitalis,	5 m.	0.3 Cc.
Syrup, acid, citric, to measure	2 fl. dr.	8 Cc.
Dose.—Dessertspoonful.		

MISTURA DYSENTERIC.

(Saline Dysenteric Mixture.)

Each dessertspoonful contains—		
Magnes. sulph.,	20 gr.	1.3 Gm.
Ac., sulph., dil.,	10 m.	0.6 Cc.
Tr. opium, deod.,	10 m.	0.6 Cc.
Tr. ginger,	10 m.	0.6 Cc.
Water, chloroform, to measure	2 fl. dr.	8 Cc.
Dose.—Dessertspoonful.		

MISTURA ENTERICA.

Each teaspoonful contains—		
Chloroform,	5 m.	0.3 Cc.
Tr. capsicum,	5 m.	0.3 Cc.
Ac., sulphuric, aromat.,	10 m.	0.6 Cc.
Spts. camphor,	10 m.	0.6 Cc.
Tr. opium, deod.,	10 m.	0.6 Cc.
Spts., wine, Gallic, to measure	1 fl. dr.	4 Cc.
Dose.—One teaspoonful.		

MISTURA EXPECTORANS.

Each dessertspoonful contains—		
Acid, hydrocyanic, dil.,	1 m.	0.06 Cc.
Spts. chloroform,	10 m.	0.6 Cc.
Acid, hydrobromic (34 per cent.),	7.5 m.	0.5 Cc.
Syrup, senega,	10 m.	0.6 Cc.
Syrup, squill,	15 m.	1 Cc.
Syrup, wild cherry, to measure	2 fl. dr.	8 Cc.
Dose.—Dessertspoonful.		

MISTURA FERRI APERIENS.

Each tablespoonful contains—		
Ferrous sulphate,	1 gr.	0.065 Gm.
Magnesium sulphate,	60 gr.	4 Gm.
Acid, sulphuric, dil.,	7.5 m.	0.5 Cc.
Syrup, ginger,	1 fl. dr.	4 Cc.
Inf. quassia, to measure	4 fl. dr.	15 Cc.
Dose.—Tablespoonful.		

MISTURA FERRI ET AMMONII ACETATIS.

(Basham's Mixture. Under the name, at first, of "Mistura Ferri Chloridi Composita," the following formula, in its essential ingredients, has been used in the Philadelphia Hospital since 1875, and possibly earlier. It is thought to be the original formula of Dr. W. K. Basham, of Westminster Hospital, London, and differs radically from the watery product of the U. S. Pharmacopœia of 1890 (Liquor Ferri et Ammonii Acetatis), which represents, in each tablespoonful, only about 5 minims of tincture of ferric chloride and 48 minims of solution of ammonium acetate.)

Each tablespoonful contains—		
Tr. ferric chloride,	10 m.	0.6 Cc.
Acid, acetic, dilute,	15 m.	1 Cc.
Sol. ammonium acetate,	2 fl. dr.	8 Cc.
Elixir, orange,	30 m.	2 Cc.
Glycerin,	30 m.	2 Cc.
Water, to measure	4 fl. dr.	15 Cc.
Dose.—Tablespoonful.		

P. H.

MISTURA FERRI SALICYLATIS.

(Antirheumatic.)

Sodium salicylate,		
Glycerin,	7.5 gr.	0.5 Gm.
Mucilage, acacia,	15 m.	1 Cc.
Tr. ferric chlor.,	7.5 m.	0.5 Cc.
Oil, gaultheria,	7.5 m.	0.5 Cc.
Solution, ammonium citrate (B. P.), to measure	$\frac{1}{2}$ m.	0.03 Cc.
Dose.—One to two teaspoonfuls.		

S. Solis Cohen.

MISTURA FERRI PHOSPHATIS.

(Iron Lemonade. Useful especially in debilitated children.)

Each teaspoonful contains—		
Tr. ferric chloride,	10 m.	0.6 Cc.
Acid, phosphoric, dilute,	10 m.	0.6 Cc.
Glycerin,	15 m.	1 Cc.
Syrup, acid, citric, to measure	1 fl. dr.	4 Cc.
Dose.—One to two teaspoonfuls.		

MIST. FERRI ET POTASS. CHLORATIS.

(Astringent Iron Gargle.)

Tr. ferric chloride,		
Acid, acetic,	2 fl. dr.	8 Cc.
Sol. ammon. acet.,	15 m.	1 Cc.
Sol. potass. chlorate, sat.,	4 fl. dr.	15 Cc.
Glycerin,	4 fl. oz.	120 Cc.
Water, peppermint, to measure	3 fl. dr.	12 Cc.
Gargle.		

MIST. FERRI ET QUININÆ PHOSPHATIS.

Each tablespoonful contains—		
Quinine sulphate,	2.5 gr.	0.15 Gm.
Acid, phosphoric, dil., sufficient,		
Iron pyrophos., sol.,	2.5 gr.	0.15 Gm.
Glycerin,	30 m.	2 Cc.
Elixir, orange,	1 fl. dr.	4 Cc.
Sol. ammon. acet., sufficient,		
Water, to measure	4 fl. dr.	15 Cc.
Dose.—Tablespoonful.		

MISTURA GENTIANÆ ACIDA.

Each tablespoonful contains—

Acid, nitrohydrochloric, dilute,	10 m.	0.6 Cc.
Inf. gentian, co., to measure	4 fl. dr.	15 Cc.

Dose.—Tablespoonful.

MISTURA NUCIS ACIDA.

(Acid Nux Mixture. A good mixture for many varieties of dyspepsia.)

Each teaspoonful contains—

Acid, hydrochloric, dilute,	10 m.	0.6 Cc.
Tr. nux vomica,	10 m.	0.6 Cc.
Tr. pepper, black,	5 m.	0.3 Cc.
Glycerin,	5 m.	0.3 Cc.

Inf. gent. comp., to measure 1 fl. dr. 4 Cc.
Dose.—Teaspoonful.

MISTURA PECTORALIS.

(Useful in coughs when it is desired to stimulate the mucous membrane.)

Each dessertspoonful contains—

Ammonium chloride,	5 gr.	0.3 Gm.
Spts. ammon. aromat.,	2 m.	0.12 Cc.
Syr. senega,	10 m.	0.6 Cc.

Mist. liquorice, comp., to measure 2 fl. dr. 8 Cc.

Dose.—Dessertspoonful to tablespoonful.

MISTURA PEPSINÆ ET STRYCHNINÆ.

Each teaspoonful contains—

Strychnine sulph.,	$\frac{1}{8}$ gr.	0.001 Gm.
Pepsin, scaled,	2.5 gr.	0.015 Gm.
Acid, hydrochloric, dilute,	5 m.	0.3 Cc.
Tr. card. comp.,	10 m.	0.6 Cc.

Water, to measure 1 fl. dr. 4 Cc.

Dose.—One to two teaspoonfuls.

MISTURA PILOCARPINÆ, SPARTEINÆ, ET DIGITALIS.

(Very useful in uræmia.)

Each dessertspoonful contains—

Pilocarpine nitrate,	$\frac{1}{8}$ gr.	0.004 Gm.
Spartaine sulphate,	$\frac{1}{4}$ gr.	0.016 Gm.

Water, chloroform, infusion, digitalis, of each, to measure 2 fl. dr. 8 Cc.

Dose.—Dessertspoonful.

D. E. H.

MISTURA SODÆ.

(Soda Mint.)

Each tablespoonful contains—

Sodium bicarbonate,	10 gr.	0.6 Gm.
Spts. ammon. aromat.,	7.5 m.	0.5 Gm.

Water, peppermint, to measure 4 fl. dr. 15 Cc.

Dose.—Tablespoonful.

Philadelphia Hospital.

MISTURA SODÆ ET RHEI.

Each dessertspoonful contains—

Sodium bicarbonate,	3 gr.	0.2 Gm.
Tr. capsicum,	2 m.	0.12 Cc.
Tr. nux vomica,	5 m.	0.3 Cc.
Tr. rhubarb,	30 m.	2 Cc.

Water, peppermint, to measure 2 fl. dr. 8 Cc.

Dose.—Dessertspoonful to tablespoonful.

MISTURA TEREBINI.

Each teaspoonful contains—

Terebene,	3 m.	0.2 Cc.
Oil, gaultheria,	1 m.	0.06 Cc.

Acacia, sufficient.
Syrup, wild cherry, to measure 1 fl. dr. 4 Cc.
Dose.—One or two teaspoonfuls in water.

MISTURA ZOLLICKOFFERI.

(Zollickoff's Mixture. For chronic rheumatism.)

Each tablespoonful contains—

Potassium iodide,	10 gr.	0.6 Gm.
Resin, gualac,	5 gr.	0.3 Gm.
Wine, colchicum root,	15 m.	1 Cc.

Acacia, powd., sufficient.
Water, cinnamon,
Syrup, ginger, of each, to measure 4 fl. dr. 15 Cc.

Dose.—Tablespoonful.

OLEA.

OLEUM CARBOLATUM.

Acid, carbolic,	2.5 per cent.
Oil, olive,	97.5 per cent.

Philadelphia Hospital.

OLEUM LINI ET CALCIS.

(Carron Oil.)

Oil, linseed,
Water, lime, of each, equal volume.

PILULÆ.

PILULÆ ALOINI, BELLADONNÆ ET NUCIS VOMICÆ.

Each pill contains—

Aloin,	$\frac{1}{8}$ gr.	0.013 Gm.
Ext. belladonna,	$\frac{1}{8}$ gr.	0.008 Gm.
Ext. nux vomica,	$\frac{1}{8}$ gr.	0.008 Gm.

PILULÆ ALOINI, BELLADONNÆ ET NUCIS VOMICÆ COMP.

Each pill contains—

Aloin,	$\frac{1}{8}$ gr.	0.013 Gm.
Ext. belladonna,	$\frac{1}{8}$ gr.	0.008 Gm.
Ext. nux vomica,	$\frac{1}{8}$ gr.	0.008 Gm.
Ext. cascara sagrada,	1 gr.	0.065 Gm.

Dose.—One pill.

PILULÆ ANTIPYRETICÆ.

Each pill contains—

Powd. opium,	$\frac{1}{8}$ gr.	0.016 Gm.
Powd. ipecac,	$\frac{1}{8}$ gr.	0.016 Gm.
Powd. digitalis,	$\frac{1}{8}$ gr.	0.032 Gm.
Quinine sulphate,	$\frac{1}{8}$ gr.	0.065 Gm.

Dose.—One pill every six hours.

Niemeyer.

PILULÆ ARGENTI ET OPII.

Each pill contains—

Silver nitrate,	$\frac{1}{8}$ gr.	0.008 Gm.
Powd. opium,	1 gr.	0.065 Gm.

Dose.—One or two pills.

PILULÆ ARSENICALES.

Each pill contains—

Acid, arsenous,	$\frac{1}{8}$ gr.	$\frac{1}{8}$ gr.	$\frac{1}{8}$ gr.	$\frac{1}{8}$ gr.
— 0.001 Gm.	0.0015 Gm.	0.002 Gm.	0.003 Gm.	

Dose.—One pill.

PILULÆ ARSENICI ET CINCHONINÆ.

Each pill contains—

Acid, arsenous,	$\frac{1}{8}$ gr.	0.003 Gm.
Ext. nux vomica,	$\frac{1}{8}$ gr.	0.016 Gm.
Cinchonine sulphate,	$\frac{1}{8}$ gr.	0.13 Gm.
Mass. ferrous carbonate,	2 gr.	0.13 Gm.

Dose.—One pill.

PIL. ARSENICI, STRYCHNINÆ ET FERRI.

Each pill contains—

Acid, arsenous,	$\frac{1}{8}$ gr.	0.003 Gm.
Strychnine sulphate,	$\frac{1}{8}$ gr.	0.0015 Gm.
Iron, reduced,	1 gr.	0.065 Gm.

Dose.—One pill.

PILULÆ ARSENICI, STRYCHNINÆ ET QUININÆ.

Each pill contains—
 Acid, arsenous, $\frac{1}{16}$ gr. | 0.008 Gm.
 Strychnine sulphate, $\frac{1}{16}$ gr. | 0.0015 Gm.
 Quinine sulphate, 2 gr. | 0.13 Gm.
 Dose.—One pill.

PILULÆ CREOSOTI.

Each pill contains—
 Creosote, beechwood, 1 m. 2 m.
 — 0.06 Cc. 0.12 Cc.
 Dose.—One or more pills.

PILULÆ CUPRI COMPOSITÆ.

Each pill contains—
 Copper sulphate, $\frac{1}{8}$ gr. | 0.008 Gm.
 Powd. opium, $\frac{1}{8}$ gr. | 0.008 Gm.
 Ext. nux vomica, $\frac{1}{8}$ gr. | 0.008 Gm.
 Dose.—One every three or four hours.

PILULÆ FERRI CARBONATIS.

(Blaud's Pills. Iron is here in a permanently preserved form.)

Each pill contains—
 Mass, ferrous carbonate, 3 gr. | 0.2 Gm.
 Potass. sulphate, 2 gr. | 0.13 Gm.
 Potass. carbonate, $\frac{1}{8}$ gr. | 0.02 Gm.
 Acacia,
 Althæa, of each, sufficient.
 Dose.—One or more pills. J. W. E.

PIL. FERRI, QUININÆ ET STRYCHNINÆ.

Each pill contains—
 Iron pyrophos., 1.5 gr. | 0.1 Gm.
 Quinine sulphate, 1 gr. | 0.065 Gm.
 Strychnine sulphate, $\frac{1}{16}$ gr. | 0.001 Gm.
 Dose.—One or two pills.

PILULÆ HEPATICÆ COMPOSITÆ.

Each pill contains—
 Powd. ipecac, $\frac{1}{4}$ gr. | 0.02 Gm.
 Powd. black pepper, $\frac{1}{4}$ gr. | 0.065 Gm.
 Sodium bicarb., 3 gr. | 0.2 Gm.
 Mass, mercurial, 3 gr. | 0.2 Gm.
 Dose.—One every two hours after supper until three are taken, followed in the morning, before breakfast, by a saline purgative. J. W. E.

PILULÆ HYDRARGYRI CHLORIDI CORROSIVUM.

Each pill contains—
 Mercuric chloride, corrosive,
 $\frac{1}{16}$ gr. $\frac{1}{16}$ gr. $\frac{1}{16}$ gr.
 — 0.008 Gm. 0.004 Gm. 0.005 Gm.
 Dose.—One pill.

PILULÆ HYDRARGYRI IODIDI FLAVI.

Each pill contains—
 Mercurous iodide, yellow,
 $\frac{1}{8}$ gr. $\frac{1}{8}$ gr. $\frac{1}{8}$ gr.
 — 0.008 Gm. 0.016 Gm. 0.032 Gm.
 Dose.—One pill.

PILULÆ PLUMBI ET OPII.

Each pill contains—
 Extract, opium, $\frac{1}{8}$ gr. | 0.016 Gm.
 Lead acetate, 2 gr. | 0.13 Gm.
 Dose.—One or two pills.

PILULÆ PURGATIVÆ COMPOSITÆ.

Each pill contains—
 P. E. colocynth comp., 1.25 gr. | 0.08 Gm.
 Mercurous chloride, mild, 1 gr. | 0.065 Gm.
 Ext. jalap, $\frac{1}{8}$ gr. | 0.032 Gm.
 Gamboge, $\frac{1}{8}$ gr. | 0.016 Gm.
 Ext. hyoscyamus, $\frac{1}{8}$ gr. | 0.008 Gm.
 Oil, peppermint, 1 m. | 0.004 Cc.
 Dose.—Three or four pills.

PILULÆ QUININÆ.

Each pill contains—
 Quinine sulphate,
 1 gr. 2 gr. 3 gr. 5 gr.
 — 0.065 Gm. 0.13 Gm. 0.2 Gm. 0.3 Gm.
 Dose.—One pill.

PILULÆ THYMOL.

Each pill contains—
 Thymol, 3 gr. | 0.2 Gm.
 Powd. soap, 1.5 gr. | 0.1 Gm.
 Dose.—One pill.

PULVERES.

PULVERES ACETANILIDI COMPOSITI.

Each powder contains—
 Powd. acetanilid,
 Sodium bicarbonate, of
 each, 2.5 gr. | 0.15 Gm.
 Dose.—One or two powders.

PULVERES CAFFEINÆ COMPOSITI.

(A good headache powder.)

Each powder contains—
 Caffeine (alk.), 1.5 gr. | 0.1 Gm.
 Powd. acetanilid, 2.5 gr. | 0.15 Gm.
 Sodium salicylate, 5 gr. | 0.3 Gm.
 Dose.—One or two powders.

PULVERES BISMUTHI.

Each powder contains—
 Bismuth subnitrate,
 5 gr. 10 gr. 15 gr. 30 gr.
 — 0.3 Gm. 0.6 Gm. 1 Gm. 2 Gm.
 Dose.—One powder.

PULVERES BISMUTHI ET BISMUTHI.

Each powder contains—
 Bismuth subgallate, 5 gr. | 0.3 Gm.
 Bismuth subnitrate, 15 gr. | 1 Gm.
 Dose.—One or two powders.

PULVERES BISMUTHI CUM KINO.

Each powder contains—
 Powd. kino, 10 gr. | 0.6 Gm.
 Powd. cinnamon, 10 gr. | 0.6 Gm.
 Bismuth subnitrate, 10 gr. | 0.6 Gm.
 Bismuth subgallate, 5 gr. | 0.3 Gm.
 Dose.—One powder every two or three hours.

PULVERES BISMUTHI CUM SODA.

Each powder contains—
 Bismuth subnitrate, 10 gr. | 0.6 Gm.
 Sodium bicarb., 10 gr. | 0.6 Gm.
 Dose.—One or two powders.

PULVERES MERCUROSII COMPOSITI.

(Less griping than the ordinary bicarbonate and calomel mixture.)

Each powder contains—
 Mercurous chloride, mild, $\frac{1}{16}$ gr. | 0.005 Gm.
 Powd. ipecac, $\frac{1}{16}$ gr. | 0.005 Gm.
 Powd. black pepper, $\frac{1}{16}$ gr. | 0.032 Gm.
 Sodium bicarb., 2 gr. | 0.13 Gm.
 Dose.—One powder every two hours until six are taken, followed by a saline purgative. J. W. E.

PULVERES MORPHINÆ SULPHATIS.

Each powder contains—
 Morphine sulphate, $\frac{1}{16}$ gr. $\frac{1}{16}$ gr.
 — 0.008 Gm. 0.016 Gm.
 Dose.—One powder.

PULVERES PANCREATINI CUM SODA.

Each powder contains—
 Pancreatin, 5 gr. | 0.3 Gm.
 Sodium bicarb., 10 gr. | 0.6 Gm.

SUPPOSITORIA.

SUPPOSITORIA ACIDI TANNICI.

Each suppository contains—
 Acid, tannic, 5 gr. 0.3 Gm.
 Dose.—One suppository.

SUPPOSITORIA IODOFORMI.

Iodoform, 5 gr. 10 gr.
 — 0.3 Gm. 0.6 Gm.
 Dose.—One suppository.
 P. H.

SUPPOSITORIA OPII.

Each suppository contains—
 Powd. opium, 1 gr. 2 gr.
 — 0.032 Gm. 0.065 Gm. 0.13 Gm.
 Dose.—One suppository.

SUPPOSITORIA OPII ET BELLADONNÆ.

Each suppository contains—
 Powd. opium, 1 gr. 0.065 Gm.
 Ext. belladonna, ¼ gr. 0.016 Gm.
 Dose.—One suppository.

SUPPOSITORIA OPII ET PLUMBI.

Each suppository contains—
 Powd. opium, 1 gr. 0.065 Gm.
 Lead acetate, 3 gr. 0.2 Gm.
 Dose.—One suppository.

SUPPOSITORIA QUININÆ.

Each suppository contains—
 Quinine sulphate, 5 gr. 10 gr.
 — 0.3 Gm. 0.6 Gm.
 Dose.—One suppository.

SYRUPI.

SYRUPUS HYPOPHOSPHITUM CUM FERRO.

Each teaspoonful contains—
 Ferrous lactate, 1 gr. 0.065 Gm.
 Acid, lactic, 2 m. 0.12 Cc.
 Syrup, hypophos., to
 measure 1 fl. dr. 4 Cc.
 Dose.—One or more teaspoonfuls.
 Philadelphia Hospital.

SYRUPUS POTASSII IODIDI.

Each teaspoonful contains—
 Potassium iodide, 10 gr. 0.6 Gm.
 Syrup, sarsap. comp., to
 measure 1 fl. dr. 4 Cc.
 Dose.—One to two teaspoonfuls.

SYRUPUS POTASSII IODIDI COMPOSITUS.

Each teaspoonful contains—
 Potassium iodide, 10 gr. 0.6 Gm.
 Mercuric chloride,
 corrosive, ¼ gr. 0.003 Gm.
 Syrup, sarsap. comp., to
 measure 1 fl. dr. 4 Cc.
 Dose.—One to two teaspoonfuls.

SYRUPUS QUININÆ.

Each teaspoonful contains—
 Quinine hydrochlorate, 2.5 gr. 0.15 Gm.
 Ac. hydrochlor., dil., 1.25 m. 0.075 Cc.
 Glycerin, 7.5 m. 0.45 Cc.
 Syrup, 22.5 m. 1.3 Cc.
 Water, chloroform, to
 measure 60 m. 4 Cc.
 Dose.—One to four teaspoonfuls.

TINCTURÆ.

TINCTURA DIGITALIS.

(Fat-free digitalis is made by exhausting the ground leaves with petroleum benzin to remove fat, etc., and drying the residue thoroughly to remove traces of benzin odor. The fat-free tincture is made from the fat-free digitalis by percolating with diluted alcohol to exhaustion and neutralizing free fatty acids in percolate with sufficient water of ammonia. Lastly, sufficient menstruum is added to percolate to make the necessary volume.)

Each teaspoonful represents—

Powdered digitalis 8.5 gr. 0.55 Gm.
 (fat-free),
 Water, ammonia, sufficient.
 Diluted alcohol, to measure 1 fl. dr. 4 Cc.

Dose.—Ten to thirty minims.

J. W. E.

TINCTURA PIPERIS NIGRI.

Each teaspoonful represents—
 Powd. black pepper, 4 gr. 0.25 Gm.
 Alcohol, to measure 1 fl. dr. 4 Cc.
 Dose.—Fifteen to sixty minims.

UNGUENTA.

UNGUENTUM ALBUM.

Zinc oxide, 30 gr. 2 Gm.
 Alcohol, 1 fl. dr. 4 Cc.
 Oil, castor, to measure 1 fl. oz. 30 Cc.
 Hornor.

UNGUENTUM BALSAMI PERUVIANI.

Balsam, Peru, 1 dr. 4 Cc.
 Petrolatum, to make 1 tr. oz. 30 Gm.

UNGUENTUM HYDRARGYRI AMMONIATI.

Mercury, ammoniated, 48 gr. 3 Gm.
 Glycerin, 30 m. 2 Cc.
 Cerate, to make 1 tr. oz. 30 Gm.
 Philadelphia Hospital.

UNGUENTUM ICHTHYOL.

Ichthyol (Am.), 1 dr. 4 Gm.
 Cerate, 7 dr. 26 Gm.

UNGUENTUM MAURI.

(For venereal sores.)

Powd. rhubarb, 30 gr. 2 Gm.
 Powd. opium, 30 gr. 2 Gm.
 Oint. mercuric nitrate, 1 dr. 4 Gm.
 Petrolatum, to make 1 tr. oz. 30 Gm.
 Maury.

UNGUENTUM PETROLATI CARBOLATUM.

Acid, carbolic, 30 m. 2 Cc.
 Glycerin, 30 m. 2 Cc.
 Petrolatum, to make 1 tr. oz. 30 Gm.

UNGUENTUM ZINCI CARBOLATUM.

Acid, carbolic, 30 m. 2 Cc.
 Glycerin, 30 m. 2 Cc.
 Ointment, zinc oxide, to
 make 1 tr. oz. 30 Gm.

ON THE USE IN THERAPEUTICS OF CACODYLIC ACID AND ITS DERIVATIVES.

BY ARMAND GAUTIER, M.D.,

Member of the Institute; Professor at the Paris Medical Faculty.

THE use of arsenic in medicine appears to go back as far as our historical knowledge carries us, and it is from the ancient customs that we have derived our present habit of giving mineral preparations of arsenic in chest and skin diseases, cachexia, and tenacious cases of malaria.

But, although arsenic has been used in this way for thirty-odd centuries, it has always shown itself to be an uncertain remedy, mysterious in action, variable in its effects,—a second-class remedy, according to Hayem, who writes: “The effect of arsenic on nutrition is still not clearly defined; it appears to depend on the dose, though in many cases it is barely tolerated, even in small doses, on account of a dyspeptic condition. It is reputed to increase appetite, to lessen tissue-waste, and to cause the patients to gain in weight; but even in these particulars we find ourselves in the presence of conflicting opinions.”

These drawbacks to the use of arsenic, as well as its advantages, which are rather suspected than definitely certain, have led physicians to look for a method of giving this drug which may make it less dangerous and more tolerable for the patient. Five years ago Dr. Danlos, physician to the St. Louis Skin Hospital, in Paris, struck with the disadvantages of the prolonged use of arsenic in cutaneous disorders, asked my advice on this point, after making some personal research towards finding some more harmless arsenical preparation. I suggested that he should try cacodylic acid, which contains an abundance of arsenic in a soluble state and in an organic form, and which, at the same time, is practically harmless. The tests which he made with this drug fully realized the hopes we had based on it, but he tried it only in his special department of skin diseases,—psoriasis, acne, lichen, lupus, etc.

He has quite recently given me the results of his experience in

the few following lines: "The experience of some years that I now have of this remedy goes to show that cacodylic acid is a very valuable form of the administration of arsenic. Its very slight toxicity enables us, as it were, to saturate the system with arsenic without danger of poisoning. In psoriasis, especially, it gave me, in certain inveterate cases, results that were better than those derived from any other treatment. There are, however, some facts in this connection which must be understood: even in psoriasis, recovery was not always more lasting than with patients who had been cured by other processes, and when the remedy is taken by the mouth the breath acquires a smell of onions that is annoying, while in large doses some patients have colics or outbreaks of exfoliative dermatitis that are sometimes accompanied by pyrexia. When taken hypodermically, the bad breath and other symptoms do not occur or are rare; at least, for my part, I have never seen them. In two of my cases of psoriasis, after a prolonged treatment of this sort the patients complained of severe pains in the legs, which in one instance continued for a long time."

"The dose given daily varied between 0.40 and 0.60 [from $6\frac{1}{2}$ to $9\frac{1}{2}$ grains] of cacodylic acid for men, and 0.30 to 0.40 [from $4\frac{1}{4}$ to $6\frac{1}{2}$ grains] for women. Some patients took with impunity for several weeks 0.80 [12 grains] per diem, this being the only way in which their condition could be improved. Hypodermically I have never gone beyond 0.40 [$6\frac{1}{2}$ grains] per diem, and this method seems to me the best; this dose kept up for two months was what gave me the best results."

Three years after I first proposed the use of cacodylic acid to Dr. Danlos, surprised at the ready way in which the human system tolerated this drug, circumstances occurred that led me to use it myself, first in serious anæmia, then in chronic malaria, and finally in chest diseases. My first cases convinced me so completely of the advantages of this new preparation that I spoke of them to a number of physicians, both for the purpose of having my results verified and to be of use to some patients in whom I took a special interest. But before giving their experience with this drug I shall mention my own cases to which I have just referred.

My first patient was a young peasant, eighteen years of age, who had not been able to work for a year past. When he came to see me he was profoundly anæmic, his face deadlly pale, and he had

difficulty in breathing, palpitations, and great weakness. He had never been rheumatic and his lungs were healthy, but his heart action was about 100, with quick unequal beats, missing once out of four or five pulsations, with a murmur at the base. I gave him daily 0.03 [$\frac{1}{2}$ grain] of cacodylic acid (in the form of sodium cacodylate) in a quart of milk for a week; he then rested for a week, began the acid again, and so on in alternations. At the same time I advised him to take plenty of milk and gave him some potassium iodide.

When he came back to see me at the end of a month, his strength was returning, his face was almost normal in color, and his heart-pulsation failed only about once in twelve or fifteen beats. He had gained six and one-half pounds in weight. Six months' treatment put him in such a good state of health that he set to work in the fields again, and last year he was passed for his military service. At that time only one pulsation failed in from fifty to fifty-five.

At about the same time I took care of a country girl of nineteen, who showed all the signs of incipient tuberculosis of the left apex,—hemorrhage, night-sweats, and slight pyrexia. She had lost a brother from the same complaint. I first tried creosote, with raw meat and applications of tincture of iodine; but since her condition did not improve, I had recourse to sodium cacodylate by the mouth in milk, 0.02–0.05 [from $\frac{1}{3}$ to $\frac{5}{8}$ of a grain] a day, with intervals of rest, as in the other case. As food I gave milk, eggs, and scraped raw meat. With this treatment by the end of the second week appetite reappeared, color returned, and her strength began to improve. In five weeks she gained six and one-half pounds, and at the end of six months I found that the physical signs at the apex had disappeared, her weight had increased by twenty pounds, and her condition had become so satisfactory that she had married. This was a year ago, and she is still perfectly well.

It was also in the spring of 1897 that a young lady relative of mine showed signs of a relapse of tuberculosis of the left apex,—rough breathing and râles in the upper third of the lung, streaked sputa in the morning, incessant cough in the evening, and night-sweats. Pulsations from 100 to 120, and temperature every evening from 38.6° to 38.7° and sometimes over 39° (102° F.). This patient was first put on moderate doses of creosote by the mouth, together with hypophosphites, and on the scraped raw meat diet

at high pressure. She was sent for the winter of 1897-98 to the south of France; but, as her condition did not improve and her appetite decreased more and more, it was decided, in order to spare her digestion, to resort to hypodermic injections of creosote in oil. Unfortunately, we know that creosote does not succeed well in cases with pyrexia; her evening temperature went down, it is true, from 38.6° to 37.7° , but her weakness became alarming. She then had a bad hæmoptysis, and her appetite, which had returned for a short time, disappeared completely. On her return to Paris in the spring, it was found that her left lung was invaded by moist râles in its upper half, that there was a cavity under the clavicle, while the right lung had begun to be affected. Dyspepsia was complete, and vomiting often followed coughing; sputa purulent, often mixed with blood; sleep uncertain and short; temperature from 38.3° to 38.8° in the evening, pulsations from 112 to 118, and great weakness.

In despair at the unfavorable way in which the case was turning, it occurred to me to try the effect of sodium cacodylate; but, in view of the fact that on two occasions the patient's strength had been much impaired by the use of Fowler's solution, two or three drops per twenty-four hours in milk for three days only, and that it was after this attempt that her appetite had completely disappeared, I gave up all idea of administering the remedy per os and decided to inject it beneath the skin.

I accordingly prepared the following solution:

R Cacodylic acid, 5. (gr. 77);
Saturate exactly with sod. carb. and add
Hydrochlorate of cocaine, 0.08 (gr. $1\frac{1}{4}$);
Creosote (dissolved in alcohol 8. (3ii)), drops v;
Distilled water, boiled, q. s. ad 100 c.c. ($3\frac{3}{4}$).

This solution contains 0.05 [gr. $\frac{1}{2}$] of cacodylic acid per cubic centimetre, and keeps perfectly, owing to the creosote, which is added to it for that purpose only. The injections cause no pain.

From June, 1898, on, an injection of 0.05 of cacodylic acid was made each day for eight days, then ten days of rest, eight injections, ten days rest,—and so on. As food she had milk, yolk of eggs, bread, roasted meat, and scraped raw mutton. At that time the patient weighed one hundred and fifteen pounds.

The result of the treatment was amazing, particularly when we

remember that on two former occasions arsenic had almost caused a disaster. *At the third injection* there was noticeable increase in appetite, the vomiting began to disappear and strength to return. After eight injections the evening temperature averaged one-fifth of a degree C. lower, while sleep was quieter. Little by little cough lessened, and weight increased in proportion as the temperature fell. The increase in weight and decrease in pyrexia continued in a steady and unvarying ratio for a year, and at the end of that time her evening temperature was almost normal, while her weight had risen to one hundred and fifty-two pounds from one hundred and fifteen. Pulsations, which at the beginning of this treatment were 105 in the morning and from 116 to 120 in the evening, oscillated at the end of the year between 90 and 96, while arterial tension with Potain's sphygmomanometer had risen from 13 to 16. At the present time this patient's strength and appetite have returned, and she goes about her occupations fairly well.

As regards the pulmonary lesions, her right lung is in a normal condition, while the left apex has improved very considerably and a process of cicatrization is going on in that region. Cough and expectoration have almost ceased. We cannot yet speak of complete recovery, but we can of steady progress towards recovery.

To show more vividly the radical change that has occurred in this young woman under the influence of cacodylic acid, I may say that three months ago, during the epidemic of grippe, she also went down with it for several days, her temperature rising to 37.8° and one day to 38.3°. The attack, however, passed over without making any perceptible change in her condition. When we think that a year ago she was looked on as lost, the change that has been wrought in her condition becomes manifest.

This case which I have followed with Dr. Potain, who, I may say, was both an attentive and a surprised witness, led him to try the remedy on patients in his hospital wards. His tests are of too recent date to be published, and, although he, like myself, is convinced of the remarkable efficacy of cacodylic acid in chronic tuberculosis, even at the second period, and with pyrexia, and has authorized me to say so, he reserves the right to publish his personal cases later on.

After these experiences I learned that one of my former assistants had had a relapse of tuberculosis in Lyons. I spoke of my

method to his physician, Dr. Renaut, who, at the meeting of the Academy of Medicine of May 30 last, related how he had saved this patient, and that between February and that date the patient had gained thirty-three pounds in weight under the action of rectal injections of sodium cacodylate,—that is, in the space of about four months.

I requested Dr. Burlureau, with whom I had been brought into relations during the treatment of my young relative, to try the effect of this method in his private practice, and particularly on the class of cases which we could logically expect it would benefit,—i.e., tuberculosis with and without pyrexia, cachexia, serious neurasthenia, malaria, and cancer. This he obligingly undertook to do, and, though the nine months that have since elapsed are a far shorter period than he asked me to give him to be able to form any satisfactory opinion, he thinks that what he has so far observed warrants his saying that cacodylic acid appears to be a remarkably powerful agent in tuberculosis, but that as regards the other conditions to which he was to apply it its action does not seem comparable to that of ordinary arsenic.

Dr. Roustan, of Cannes, whom I also requested at the same time (October, 1898), to try this remedy, did so, using my formula for hypodermic injections, as did also Dr. Burlureau. He found that these injections did not irritate the tissues, but that the patients' tolerance for the drug varied considerably. In some patients saturation appeared after seven or eight injections with this solution, whereas others could stand from thirty to forty consecutive daily injections. It seemed best to intercalate periods of rest about equivalent to the periods during which the remedy was administered. The patient is warned that the period of tolerance is passed by a peculiar sensation of discomfort, with flushes of heat to the head, oppression, and, if the use of the drug is not discontinued, by pyrexia.

Cacodylic acid was given by Dr. Roustan to nine cases of tuberculosis, and in all of them he noted increased strength, decreased pyrexia when the temperature was above normal, marked return of appetite, and often very manifest increase in weight. When the disorder was at an early stage, in addition to the improvements just named there was also undoubted amelioration in the local condition.

Such are the results that have been obtained by the physicians

I have named and by myself in the use of cacodylic acid in tuberculosis. The question has been raised, whether this treatment is not merely an episode in or a branch of the general treatment by arsenic; in other words, whether it is not merely a more convenient and less dangerous way of giving arsenic. Dr. Renaut appears to think so, but I do not agree with him.

Certainly cacodylic acid is a rich arsenical preparation, since it contains 54.3 per cent. of metallic arsenic, or 72 per cent. of arsenious acid. But the arsenic is present in an essentially latent, *organic* state, which frees it from all the physical, chemical, and physiological properties of ordinary arsenical preparations, of which it has none of the toxic, caustic, or necrosing qualities.

We have seen that it has been given in enormous doses for long periods, with no bad effects. Such a preparation cannot be classed with the other preparations of arsenic, with which the period of intolerance is always quickly reached. The arsenic is no doubt present in both cases, but under special forms, towards which the system reacts quite differently.

A salt can be no ordinary arsenical preparation which at the second stage of tuberculosis, and in tuberculosis with pyrexia, brings the temperature slowly but steadily down, while at the same time it stimulates assimilation and increases rapidly the weight of the body.

By using the sodium cacodylate we take advantage of the difference there is between administering an organic and a mineral preparation of arsenic, and this difference has been shown, I believe, to be a matter of some moment to the patient.

In the interest of this method, and in order to spare physicians all loss of time in testing it in tuberculosis, and particularly in tuberculosis with pyrexia, I wish to give the precautions that are indispensable to success.

The cacodylic acid must be quite pure and free from other arsenical preparations; it should not give any sulphide of arsenic or sulphuretted hydrogen when treated with an acid solution of hydrochloric acid, and it should not be decomposed by pure metallic zinc when cold. It should be only slightly acid, without taste and almost without smell, and should be protected from moisture. It is very soluble in water, and has a clearly crystalline form.

With tubercular patients it is best to use sodium or potassium

cacodylate in hypodermic injections, and not to give it per os. A dose of 0.10 [$1\frac{1}{2}$ grains] of cacodylic acid should not be exceeded in twenty-four hours; as a general thing from 0.02 to 0.05 [from $\frac{1}{3}$ to $\frac{5}{6}$ of a grain] is enough. Give a daily injection for seven or eight days, then rest for eight or ten days, and begin again. Be guided by the appetite and temperature: when the former lessens and the latter rises, it is time to begin the injections again. Stop them at the first sign of saturation,—congestive flushes to the face, loss of breath, and rise of temperature.

Feed up the patients,—from six to ten ounces of raw scraped mutton at the end of the two meals. Give food that is rich in phosphorus and calcium: for phosphorus, fish, brains, milk, and egg-yolks; for lime, vegetables and bread. Avoid phosphates, glycerophosphates, and phosphated syrups, that burden the stomach and are little or not at all assimilated.

To control coughing avoid opium, which lessens the appetite, and replace it by preparations of hyoscyamus or cynoglossum.

Keep the patient away from all dust, and particularly that of cities. Let no sweeping be done, but wipe up with cloths and an aqueous solution of formol one to two thousand. Avoid the direct rays of the sun, sudden changes of temperature, wind, useless fatigue, emotions, and late hours.

ON THE TREATMENT OF CARBUNCLE.

CLINICAL LECTURE DELIVERED AT THE LARIBOISIÈRE HOSPITAL.

BY PAUL REYNIER, M.D.,

Assistant Professor at the Paris Faculty of Medicine.

GENTLEMEN,—I have just shown you in our wards a man of forty-nine, in vigorous health, suffering from carbuncle of the neck. You probably noticed that the swelling of the region forces the patient to carry his head forward; that the skin is stretched and purple, and that this condition extends from the edge of the hair to the base of the neck, over a surface four inches wide by three high.

At the centre and towards the left of the swollen region are two openings, of which the bottom has the well-known grayish look of sphacelus; pus mingled with sloughed-off fragments is coming from these apertures and also from three or four swollen orifices around the main cavities.

The entire purple patch is thickened, raised, absolutely hard and not fluctuating at any point. At its upper edge its limit is not clearly defined, but disappears gradually into the hair; its lower edge, however, is easy to feel, and below it the skin at once reassumes its normal color and texture. Pressure gives rise to little or no pain, but the patient is in a state of stupor and subdelirium, and our questions are answered by his relatives. His face is yellow; the temperature high; the urine contains no sugar but a little albumen.

His relatives say that about a month ago he first noticed what was taken to be a boil on his neck, and that the swelling has been gradually increasing ever since. A few days ago the physician who was taking care of him made two openings with a thermocautery, which correspond to the two cavities we now see there; this intervention allowed some pus to escape, but the fever continued, the subdelirium increased, and the swelling spread. Seeing that a more radical operation was necessary, the physician then advised the patient to enter a surgical ward.

When he arrived, forty-eight hours ago, I ordered the carbuncle to be exposed almost continually to a carbolic spray; at the same time the patient was to take as much milk as he could digest.

The following morning the temperature was a little lower, but still 102°. The appearance of the region had changed, having lost color and being less swollen. The patient did not complain of suffering, and said the spraying had done him good. I called your attention to the fact that this treatment seemed to make the pus flow more readily from the openings; still, the subdelirium continued, as also his fever, and his general condition was unsatisfactory. I then decided to operate, and I wish to call your attention to what I did, and to what we found the local state of the region to be during the operation.

After giving chloroform, I made with a thermocautery two deep incisions at right angles to each other, four inches across and three vertically, at least. The skin was hard and very much thickened, and when its section was effected I met a very thick layer of fibrous tissue, which was clearly the deep portion of the dermis thickened to four times its normal size. At a depth of about two-thirds of an inch the consistency of the tissues changed and pus was met, but so thick that it would scarcely flow from the pockets in which it lay, pockets separated from each other by fibrous tissue and forming distinctly separate foci.

After having gone through this second layer, which was also two-thirds of an inch thick, I came to a sheet of pus far more fluid than that which was in the pockets, and after having opened up the region thoroughly I found that I was on the mortified aponeurotic sheath, and that the pus lay just in front of the muscles, which I was even obliged to open superficially. Raising up the four triangular flaps made by my two incisions, I plunged the thermocautery in every direction, and in this way opened a communication into a number of closed pockets of pus similar to those found while making the incisions.

The day after the operation the temperature fell to 99°; the patient still had a little subdelirium and his skin was yellow, but his tongue was good and his reflexes were normal. A few days later he was entirely convalescent.

Before speaking to you in detail about the treatment of this disorder, let me make a few remarks about its nature.

The best definition of a carbuncle, and one that is accepted by everybody, is: an inflammatory tumor beginning in the pilo-sebaceous glandular apparatus, spreading into the dermis and subjacent cellular tissue, causing mortification of a portion of these tissues, and accompanied by general symptoms frequently of a serious nature. This inflammatory process is caused by the staphylococcus pyogenes aureus, the same germ that appears in osteomyelitis of young people. The microbial origin of the complaint explains how it comes to be contagious, as is so often demonstrated by eruptions of boils on persons who have taken care of patients suffering from carbuncle.

But, as in all cases of infection, the severity of the disorders caused by the microbe will depend on the state of health of the patient. A strong and vigorous person will be found to offer a poor field for this microbe to propagate on, and an attack may result only in one pimple of acne. In a young and lymphatic person the disease may take the form of a regular outbreak of acne. The next degree is the single boil, then an eruption of boils, and finally a carbuncle, or combination of boils.

Previous diseases or organic disorders also pave the way for a carbuncle, which may appear during convalescence from serious illness or in persons suffering from hepatic or renal affections. The more the system of a patient is deteriorated the greater the fear to be had of a carbuncle.

Carbuncles may be limited or diffuse, the latter form always indicating a bad general condition of the patient; but even then there are great differences in the power of resistance of patients. In the final stage of diabetes we get diffuse carbuncle with tendency to sphacelus; whereas in the early stage of the disease diffuse carbuncle can still be checked. The same holds true with alcoholic patients and with hepatic disorders.

Let us now see what the evolution of these tumors is, and this clinical study will lead us to the treatment to be applied.

The simplest form of carbuncle seems like an ordinary boil at the start. It has a small head, which fills with pus and is squeezed. On the following day there is more pus, which is again squeezed, in the hope of getting out the core, which when extracted from a boil generally closes the scene; but here it is found that the one original orifice is soon accompanied by others, three or four in

number, which after a certain number of days give exit to pieces of sloughed material, and in two weeks or so the tumor subsides and the tissues regain their normal appearance, though more slowly than in the case of a boil.

In this mild form there is seldom any fever,—at most, a slight rise of temperature just before the cores come out; and at that moment the pain becomes acute, and the same lymphangitis and adenitis, which are in some cases quite marked, are observed as with boils. It is a noteworthy fact, however, that the glands do not suppurate, but disappear together with the lymphangitis as soon as the pus flows freely, when the pain also decreases. In this form of carbuncle the inflammatory process does not extend deeper than the thickness of the dermis.

In the more serious forms of carbuncle, instead of finding the pain decrease when the pus begins to flow, it increases and the temperature rises, as happened with our patient. The skin becomes yellow, there may be rigors, with subdelirium and anorexia, while at the same time the tumor spreads to the dimensions you have seen in our case.

The explanation of these symptoms and the difference between this form of carbuncle and the one we have just described lie in the layer of pus that forms in the cellular tissue beneath the dermis. This pus, which is highly septic, is imprisoned, and absorption of its toxic elements gives rise to the septicæmic symptoms that I have just mentioned. When this pus is being taken up into the circulation, you may observe those intense rigors, during which the patient shakes even the bed, and that are so alarming in all cases of suppuration. If they recur you may be destined to see pyæmia set in, beginning with phlebitis around the carbuncle.

If the carbuncle is not freely opened, sphacelus may take place in the tumor, and your patient may die in a hectic condition from prolonged suppuration.

Now, as regards the gravity of carbuncle, certain symptoms will be of use to us.

It should be remembered that the less painful a carbuncle is the more serious is the case, as this condition points to a serious state of the nervous system. Another symptom of still greater importance is the disappearance of the knee-jerk. As I pointed out many years ago, in diabetes, the disappearance of the knee-reflex

indicates serious deterioration of the nervous system. The nervous system no longer controls nutrition, and it is in these cases that you see those insidious, gangrenous carbuncles that carry off so many diabetic or inveterate alcoholic patients.

With our patient you saw me test the knee-reflex, and, having found it normal, make a favorable prognosis.

I now come to the more practical question of treatment.

One of the most important rules in the management of these cases is not to handle the tumor too much or roughly. Pressure on it will almost always make it worse. Thus, with a simple pimple of acne, if you squeeze it before it has matured, you stand a fair chance of making a boil out of it. This is also true of boils, and there is no doubt that a certain number of the mild cases of carbuncle are due to boils that have been tormented at the wrong moment. These inflammatory processes of the pilo-sebaceous system should be looked on as cases of *noli me tangere*.

The best means to abort a boil is to protect it from all contact and pressure. As soon as you have reason to think that one is developing, cover it with vigo or zinc oxide plaster, and do not look at it for a week; in the majority of cases the boil will have disappeared, and this is due not so much to the antiseptic used as to the protection afforded by the plaster.

This is equally true with carbuncles: the less you worry them the sooner they will be over. A carbuncle that is let alone, except when there is something seriously wrong with the patient's general condition, will rarely give rise to the complications that I have been speaking of. It is particularly after the application of pressure that I have seen appear the high rigor indicating phlebitis, as the following instance will show. I was taking care, not long ago, of a carbuncle in a diabetic case, and under the spray treatment it was emptying itself, slowly, but without fever or serious symptoms. During a short absence I asked another physician to see the patient for me, and he thought it best to squeeze the region to make the pus come out more freely. An hour afterwards the man had a severe rigor; but this did not recur, as the carbuncle was religiously let alone after that.

By pressure you facilitate the inoculation of the cellular tissue by the pus that you squeeze from the deep face of the dermic

pockets; you can also drive the pus elements into a vein that may be damaged and break under the influence of your effort.

Personally I have never had a case of phlebitis of this sort in my career, although I have seen a great many boils and carbuncles, and this whether they were situated on the face or on other parts of the body. This is also true of Gosselin, and I am convinced that, if both Gosselin and I never saw a complication which others see, it is owing to his having taught me never to worry a boil or a carbuncle.

The most practical way of putting this precept into effect is the treatment of this disorder by spraying, as advised by Verneuil, so long as the temperature does not rise. The spraying must be prolonged for hours, as you saw done in the case of our patient; in the intervals a moist dressing should be applied, and the best is absorbent cotton dipped in a very weak solution of bichloride and covered with impermeable tissue.

The liquid used in spraying must be a very weak antiseptic, either one per cent. carbolic, bichloride one to three thousand, or boric acid. It must not be forgotten that carbuncles are generally dependent on a poor renal function, and we must fear, in these instances more than in all others, intolerance of antiseptics. I do not consider that the antiseptic used is a matter of importance, as it is the prolonged action of the moist spray that relieves the congestion and cleans the cavity. I called your attention with our patient to the change of color on the region produced by the spray, as also to the decrease in swelling and to the readier flow of pus.

Under the action of the spray I have seen many serious cases of carbuncle, even in diabetic patients, recover without incident; this year, for instance, I have treated successfully a carbuncle of the neck in a diabetic patient whose urine contained five ounces of sugar, and another one of the upper lip in a diabetic patient (with albumen) showing two ounces of sugar. But both of these men still had their knee-jerk in a normal state. Recovery in this way is slow, and the spraying has in some cases to be kept up for a full month.

When a carbuncle shows a disposition to extension and fever sets in, my method of action is different, and becomes what you have seen with our present patient. The appearance of fever denotes, in my opinion, that the inflammation has penetrated to the cellular

tissue and that a subdermic layer of pus is forming; and I have told you how septic that layer of pus is and how dangerous it is not to open it up. You must then at once make an incision, which is the only way to stop the evil and put an end to the fever, and your incision must be wide and deep. You must open not only all the superficial dermic pockets, but also the layer which, as you know, you will find deep beneath them. Your incisions must extend beyond the limits of the carbuncle, and the best way to open up such a focus is to make two incisions at right angles to each other.

You observed that I preferred the actual cautery to the knife. This was because these tumors are very vascular, with great congestion, and with a knife you may produce a flow of blood that will not be easy to check. With the cautery you also close the vascular orifices as they are made, and there is less risk of septic absorption.

When your incision is made continue the spray until the focus is completely rid of all necrosed tissue. You need then only apply an antiseptic dressing until recovery is complete.

But, while carrying out this local treatment, you must not lose sight of the fact that a carbuncle is dependent on a poor general condition, which must be looked after as well. If the patient is diabetic, a strict line of treatment for that condition must be at once prescribed. If there is albuminuria, a milk diet is indicated; but, when the state of the kidneys admits of so doing, the patient's strength should be built up by a substantial diet.

A NEW ERA IN ELECTRO-THERAPEUTICS.

BY J. McFADDEN GASTON, A.B., M.D.,

Of Atlanta, Ga.

THE treatment of diseases by electricity is engaging the attention of physicians in this country and in Europe as never before. There are regular societies for the study of the subject, such as the American Electro-Therapeutical Association, and the transactions of these bodies compare favorably with the work done by many of the larger surgical and scientific associations. Diseases that were once considered incurable are now either improved or permanently relieved by electricity when properly applied.

In an article on X-ray Dermatitis,¹ it is stated that "it is probable that the great majority of X-ray burns reported are due to lack of knowledge by those manipulating the apparatus." Too long exposure is undoubtedly harmful, and experiments have shown that "one interruption" is capable of making an X-ray picture. I have often exposed parts to be skiagraphed for ten and even fifteen minutes, and as yet have had no signs of dermatitis. Short exposures will reveal certain objects which in longer exposures are lost. The salts contained in gall-stones and stones in the bladder belong to this class. Apostoli used high-frequency currents in a total of nine hundred and thirteen patients. He made twenty-four thousand three hundred and seventy-one applications, and regards electricity applied in this manner as the best medicine in gout, neurasthenia, asthma, neuralgia, arterial sclerosis, arthritis, and many other disorders of trophic origin.

X-rays are employed in a great variety of ways. They were at first used mainly for the diagnosis of fractures, dislocations, foreign bodies, aneurisms, and various tumors; but now we find that these rays have also therapeutic power, especially suited to certain diseases of the skin, such as lupus and eczema. Gall-stones, too, have

¹ Electrical Review, August 2, 1899, p. 70.

been dissolved by their use, if an abatement of symptoms can be taken as an indication. Many cases of difficult diagnosis have been cleared up, in an unforeseen manner, by cures.

Robert Newman reported hundreds of cases of urethral stricture treated successfully by electricity, and Hogan and others have obtained similar results with weak currents from a galvanic battery. Myers finds electrolysis useful in granular diseases of the eye. The negative pole is found to be capable of disintegrating strictures in the œsophagus, larynx, and rectum, and of reducing enlarged prostates, thyroid glands, and probably even malignant tumors.

A galvanic battery of thirty cells is sufficient for most of the uses of office work. At times it is necessary to combine two batteries, and at other times to use a coulombmetre as well as a milliamperemetre. Careful experiments upon beef and other materials show that considerable resistance to the current is offered by the tissues through which it is made to pass. As much as one ampere has been used with beneficial effects.

The treatment of hemorrhoids, varicocele, hydrocele, prolapse of the rectum, fistulous sinuses, and other minor surgical diseases may be facilitated by cataphoresis. Frederick Peterson and others have demonstrated that helleborin, cocaine hydrochlorate, pilocarpine hydrochlorate, and many other alkaloids are carried from the positive pole, and G. Betton Massey uses pure mercury on a quill-like electrode of eighteen-karat gold, while McGuire and others have tried Lugol's solution on either pole. Martin has done good work by passing the remedial agent through animal membranes.

Diseases of women have been treated by electricity with highly satisfactory results. Among the most successful efforts in this direction may be mentioned the Apostoli treatment of fibroids. G. Betton Massey's treatment for endometritis and salpingitis, Sprague's catheterization of the Fallopian tubes, the destruction of pus-cells, and the stimulative influence of interpolar action upon the recuperative powers of the ovaries, the ligaments, and the muscles. J. Wesley Bovee reports favorable results in minor affections, such as displacement of the uterus and deficient innervation of the Fallopian tubes. While the symptoms of ectopic gestation were at times doubtful, in a few cases there was undoubtedly a foetus; but even where the cyst was of a different nature, a disintegration of

the mass followed, and no failure, even in the hands of beginners, occurred.

Dr. W. S. Headley¹ contributes a paper entitled "Photo-therapeutics; or, the Light Cure." He quotes in support of his views Finsen, Unna, Duclaux d'Arsonval, Charine, Charcot, Widmark, and others. His own experiments have been performed with an electrical energy of from fifteen to fifty amperes at one hundred volts, with arc lights. He is greatly impressed with the bactericidal and microbicidal action of the actinic rays. He excludes all other rays, especially heat rays, by the use of red glass or curtains.

In cases of smallpox this practice has been found efficacious in diminishing suppuration, shortening the fever, and even entirely preventing scars or pits. In this particular disease, of course, vaccination holds the first place, but in lupus and eczema Hedley justly claims that therapeutics replace prophylaxis. It is especially because Hedley's views seem to corroborate the observations of clinicians and electricians as to the X-ray that they should be given attention.

In a recent London letter² Raymond Crawford calls attention to two papers on this subject read before the British Medical Association. One was by Schiff, of Vienna, and the other by Dr. Hall Edwards, of Birmingham. The first included, among the diseases treated by X-rays, hypertrichosis, sycosis, favus, and herpes, as well as acne rosacea, lupus vulgaris, lupus erythematosus, eczema chronicum, elephantiasis Arabum, and œdema chronicum. Dr. Edwards's cases were all of lupus, but his successful treatment of these was illustrated by photographs and showed great and lasting cures. The most remarkable statement made was that "the changes set up in the tissues resulted in the conversion of chronic granulations into normal connective tissue."

Cases in my own experience tend to confirm the literature of the day and to widen the range of applicability of electricity in the treatment of malignant tumors, ankylosis, stricture, epithelial excoriations, goitre, and many other diseases. A brief mention of these cases may be acceptable to the profession.

¹ Electrical Review, September 29, 1899.

² Therapeutic Gazette, October 15, 1899.

CASE I. *Round-Celled Sarcoma of the Abdominal Cavity.*—This was considered by a number of physicians an inoperable case. Treatment by a combination of electrolysis and cataphoresis, together with the internal administration of Donovan's solution and other alteratives was attempted. This treatment was begun in November, 1895, and resulted in a complete cure, with no recurrence up to the present time. The various symptoms of sarcoma were too well recognized by the surgeons who saw this case to leave room for doubt as to the diagnosis. Nevertheless, Dr. McGuire secured a specimen, upon the microscopical examination of which an opinion was given by Dr. Moses D. Hoge, Jr., who reported that the growth was a round-celled sarcoma. The characteristic symptoms of this disease—emaciation, pallor, debility, languor, pain, and rapid growth—were present. The tumor had attained such proportions that the whole pelvis was filled with the hard, unyielding mass. At all times there was an open, granulating surface near the inguinal lymphatic gland, where an incision had been made by Dr. Holmes for the purpose of exploration.

When to the negative pole was attached a needle and to the positive pole a sponge moistened with Donovan's solution, and the current was passed through this portion of the tumor, a yellowish exudation seemed to proceed from it and bubbles might be seen over its surface. The tumor gradually diminished and is now completely eradicated, and this opening has healed, with no recurrence for three years.

Dr. R. N. Frazer tells me of a case of his in a male aged forty years. Several microscopical examinations showed the tumor to be a sarcoma. An operation was performed, but recurrence took place within a few months. Electrolysis was begun on June 24, 1897, and, by combining this method with operative interference every time the tumor recurred, a complete cure was finally secured.

CASE II. *Mammary Carcinoma.*—Mrs. M. S. M., aged seventy-two, had mammary carcinoma. Her mother, aged ninety-seven, is still living. No history of malignant tumors in her mother's family, but some suspicion as to her father's side. In July, 1898, a small mass was noticed in the left mammary gland to the inner side of the nipple. This gradually grew, and by December had become very painful. Microscopical examination by Dr. Claude A. Smith, of Atlanta, showed the tumor to be a carcinoma. On

March 9, 1899, the case was turned over to me for treatment. The breast was somewhat enlarged, and a red area existed near the nipple, which was dimpled and retracted. The patient's general health seemed to be good, but she could not sleep, so great was the pain in the breast at night.

Treatment was begun by the application of Donovan's solution on the positive pole and by puncture on alternate days of the border line of the tumor with a needle connected with the negative pole. The tumor was reduced very rapidly at first; upon discontinuing the use of the needle for a time and substituting the copper electrode with absorbent cotton moistened in a normal salt solution, there was appreciable diminution in size. She has had the needle re-applied when necessary, and as many as thirty cells have been included in the circuit. A process of disintegration has taken place in the area where redness and great hardness were present.

Since the electric treatment was undertaken, seven months ago, great improvement has occurred. The patient has not taken a single dose of morphine. At intervals of two or three weeks during the last three months, chills and fever have indicated some absorption, while œdema has occurred in the left arm and leg. A combination of codeine and fluid extract of jaborandi has been found efficacious in affording relief. When the patient's temperature was quite high (104° or 105° F.), phenacetine, quinine, camphor, calomel, etc., were used. Her present condition is encouraging for a final cure, but a flattened mass half the size of a hen's egg still remains.

CASE III. *Ankylosis of Elbow*.—Miss J. A., aged twenty-five, had ankylosis of the left elbow-joint, with enlargement of the articular surfaces of the radius, ulna, and carpal bones; the metacarpal bones were approximated and immovable. A form of treatment which combined that used in Case I. and passive motion, with frequent application of the X-ray, has been used, with manifest increase of motion following each application. Bichloride of mercury and iodide of potassium were administered internally. This patient had been treated daily with passive motion, without result. As the immobile tumor in Case II. became movable under treatment, it was thought best to make a trial of the form of cataphoresis employed in that case to secure absorption of the band of fibrous material which united the bones at the radio-ulnar articulations.

The treatment was begun about one year since, and mobility permitting use of the elbow and wrist joints has been secured.

Gwyer, of New York, has reported similar results in ten cases of false ankylosis. He employed electrolysis, with the use of various electrolytes. His results were published in the *Annals of Surgery* some months after I began to treat this case, and encouraged me to continue the treatment.

The first skiagraph taken presents many appearances not found later. The inflammation of the soft parts then seen to be present has now entirely disappeared. A band of fibrous material which was a very striking detail of the skiagraph first taken is seen to be much fainter in those secured later. At the same time the interosseous space has increased, while the actual angle of greatest flexion at the elbow is less now than it has ever been before and that of extension is greater than previously. A careful examination on each alternate day of the week has shown some passive motion possible. Pronation and supination are very greatly increased, while flexion and extension are least affected. The patient's ability to crochet, eat with knife and fork, and comb her hair are results of treatment.

CASE IV.—Mrs. M. F., aged twenty-four, had suffered with goitre for three or four years. Her general health was good; she was the mother of one child, a boy, aged six years. The tumor was noticed in July, 1898, but the patient refused treatment until July, 1899. When first seen, the size of the thyroid gland was approximately that of an ordinary Florida orange. The circumference of the neck was measured at the Adam's apple, and also below, at the cricoid cartilage. In this case the upper part of the tumor was always the most protuberant. The greatest circumference was fifteen and one-fourth and the least fourteen and one-fourth inches. After three months' treatment there was a decrease of nearly two inches in each of these measurements.

Medicine

LUPUS VULGARIS; TUBERCULIN AS A DIAGNOSTIC AGENT; RHEUMATISM; RABIES.

A WARD CLASS IN THE INSTITUTE FOR INFECTIOUS DISEASES.¹

BY GEHEIMRATH BRIEGER,

Professor of Special Pathology and Therapy at the University of Berlin, Germany.

GENTLEMEN,—For the last lesson of the year, instead of presenting one or two cases to you in detail, I have preferred to take you through the wards of the Institute with me, as I have so often done before, and say a few words about the cases that are at present subjects of special study here.

In this first pavilion we have a series of cases of tuberculosis in its various manifestations. The most striking are, of course, these cases of lupus, with their hideous deformities. I need scarcely add, however, that they by no means constitute the most fatally progressive form of this disease. We no longer attach any credence to the old tradition that patients attacked with lupus are likely to live to a good old age and enjoy a certain degree of immunity from other affections. We now know that they carry about with them continually a focus of infection, always virulent and prone to become generalized, perhaps when least expected, with fatal results. Still there remains the clinical experience that such a generalization of their bacillary infection is a comparative rarity, and that patients as deeply scarred as this one may continue to enjoy general good health for decades.

Our patient here is a boy, sixteen years of age, in whom the disease has made sad ravages. His nose has almost completely disappeared, leaving the nostril openings surrounded by cicatricial

¹ Professor Koch's department of the Charité Hospital, Berlin.

tissue, that needs frequent dilatation in order to allow the function of nasal breathing to be continued. His eyes have disappeared, and their sockets have become partly filled up and obliterated by the deposit and subsequent contraction of cicatricial tissue. There remain here at both inner canthi slight hollows, the remnants of the tear-ducts and the structures in their neighborhood that have withstood the intensely destructive progress of the disease. All over the face there are signs of the same deep destruction of tissue. Here on the cheeks are shiny-red cicatricial patches and nodules of lupoid tissue. The thickened lips are everted, projecting, hypertrophic, and the oral opening remains permanently patent, presenting the condition known by analogy to the eyelids as eclabium. The lesions characteristic of progressive lupus that were present on the edges of the diseased patches at the time of his admission, have disappeared. Beyond the line of the disease the fresh brownish-red or yellowish-red nodules that indicate recent invasion are no longer seen. The process has come to a stand-still. For years every approved remedy had been tried without avail. The disease continued to advance ruthlessly, seemingly uninfluenced by any therapeutic measures. There were intervals of comparative remission, it is true; but they could scarcely be attributed to the treatment employed, and were inevitably followed by further advance of the disease despite the employment of every possible means of prophylaxis and the administration of every known therapeutic agent.

Last fall we began injections of the new tuberculin, tuberculin R, and since this form of treatment was instituted there has been no further advance of the disease. The effect was almost immediately noticeable, and the specific action of the remedy has continued to the present time. The recent nodules at the periphery of the lupus patch began to involute, cicatrization set in where destruction of tissue had previously been in progress, and the present condition of practical cessation of the ulcerative process supervened. It is a most striking example of the therapeutic effect of the tuberculin R, and it has been one of those cases in which suggestion or self-deception on the physician's part could play no rôle, for the pathological process was in plain view, and the modifications that it underwent as the result of treatment have taken place directly under our eyes. The effect of any remedy upon the pathological lesions in pulmonary processes may be questioned, despite the gen-

eral improvement of the patient's condition, but in a case like this there is no room for doubt.

That we have not here to do merely with one of the remissions so frequent in the course of this disease, seems to be sufficiently proved by the long continuance of the improvement without further relapse and the completeness of the process of cicatrization. Other cases have been treated with equal success, and, while very little effect seems to be produced in some instances, these are but proofs of the fact that there are features of the tuberculous process that we do not yet fully understand. To say that a process is tuberculous does not give an exhaustive description of it, nor does it follow that it is identical with other lesions produced under similar circumstances by the tubercle bacillus. Each tuberculous process is a distinct entity in the patient in whom it occurs. The personal idiosyncrasy and special resistive vitality of the individual give the lesions produced in any given case a specific character peculiar to themselves. Further investigation is needed for the revelation of the basis on which these individual peculiarities rest, but the great therapeutic secret, the agent which under most circumstances causes the tissue reaction necessary to produce involution of tuberculous lesions, has been discovered.

Notwithstanding the long continuance of this case and the constant opportunities that have been present during all these years for autoinfection,—by means of the finger-nails, for instance,—there are no lesions on any other part of the patient's body. This is often, but not always, the case, and it is a fault often committed by the inexperienced, to overlook the existence of lesions on other parts of the body. In lupus, especially when the facial or apparent lesion is small, never fail to look for lesions elsewhere.

Our next patient is one who, despite treatment by several physicians, has suffered severely from neglect of this precaution. Here the nasal lesion has existed for several years, now better, now worse, and has seemed to yield to the various therapeutic measures adopted for its cure, though it has always relapsed. This larger, deeper patch on the breast and this one on the inside of the thigh have, mainly through the patient's own neglect, but partly also because his physician failed to insist on a thorough examination of his body, been allowed to advance practically untreated, until they are now very serious lesions. Lupus patches are, as a rule, so

indolent, their appearance changes so little from day to day, and they give so little pain or even discomfort, that patients are apt to neglect them unless their visibility makes them noticeable to others.

In this case also the new tuberculin has proved very efficacious. The formation of new nodules of lupoid tissue at the edge of the existing lupus patches has ceased, though it could be observed regularly before our treatment was instituted. The older parts of the lesions are beginning to cicatrize. We are, on the whole, very hopeful of the success of the tuberculin in this case.

We do not use large doses of the tuberculin in these cases,—only enough to cause a reaction, gradually increasing the dose as the patient becomes tolerant of the remedy. Often at the beginning a few milligrammes of the tuberculin will suffice, and the dose should be increased slowly. More than twenty cubic centimetres should never be given, and that only to those who have shown themselves to be especially resistant to the remedy. The results obtained by us here at the Institute for Infectious Diseases, for a period already extending over two years, certainly make it incumbent upon those who have obstinate cases of lupus vulgaris under treatment to use tuberculin, at least when other remedies have failed.

We have in this ward several other forms of tuberculosis, among them this case of the incipient pulmonary form, in which the patient is at the same time suffering from lupus erythematosus. It must be borne in mind that the present trend of medical opinion inclines to associate this disease with tuberculosis. Not that it is thought to be directly dependent upon local infection by tubercle bacilli, but that it seems to be due to the specific action of tuberculous toxins in the system upon the cutaneous circulation of the region affected in this disease, in those whose peripheral circulation has already been disturbed by other causes.

We have here two cases of incipient tuberculosis of the lungs in which the diagnosis, so far as I can see, would have been impossible without the use of tuberculin. In one there exists a slight cough, with very little expectoration, and we have been unable to detect any bacilli in the sputum. The patient is a thin individual and has lost six pounds in weight during the last six or eight weeks. When he came in he complained of general malaise and became

easily tired, especially in the afternoons. We found that there was a post-prandial rise of temperature to about 100° F. nearly every afternoon. There were absolutely no physical signs. It was just one of those puzzling cases in which even the best of diagnosticians is unable to decide as to the presence or absence of a focus of tuberculous disease. In cases like this the use of tuberculin as a diagnostic test of the presence of tubercle is practically indispensable. It enables one to decide definitely and in a very short time the all-important question. Of late we have come to realize that consumption in a very early stage is an easily curable malady. It is only after disintegration of the tuberculous material has set in that the disease either gets beyond therapeutic control, or yields to treatment and is cured only after long and stubborn resistance. Even in the favorable cases the patient is never entirely free from an inherent tendency to relapse, and must guard carefully against every possibility of invasion by the tubercle bacillus.

We tried the tuberculin test in this case, and, after failing to get a reaction with one milligramme, we tried five milligrammes, with no better result. To ten milligrammes, however, the patient reacted very promptly and unmistakably. As the affection has progressed somewhat in the time that has elapsed since our successful diagnostic test was made, over three weeks ago, we find our diagnosis confirmed by the prolonged and roughened breathing and an occasional crepitant râle now heard at the right apex. Our patient has gained four pounds in weight, and his appetite has also improved. We hope that the development of these demonstrable physical signs means nothing more than the throwing off of certain pathological products as a result of the constitutional reaction that has taken place, and is not due to further invasion of the disease.

This second case is even more interesting as demonstrating the value of tuberculin for diagnostic purposes. The patient is twenty-nine years of age; he has lost about ten pounds in weight during the last three months, and is not of a build liberal enough to suffer such a loss with impunity. He has manifested a tendency to very free sweating on nights that were at all warm, especially if he had taken much exercise during the day. He has had a dry cough, with scarcely any expectoration. Though we secured several specimens of the sputum raised in the morning, we have not succeeded in

finding tubercle bacilli, notwithstanding careful search. He has had no demonstrable physical signs, and his apices are certainly not affected, as far as physical diagnosis can determine. His loss of weight, his slight cough, his night-sweats, with the indication of consequent exacerbations of temperature which they gave, amply justified us in trying the tuberculin test. There was a prompt and well-marked reaction following the injection of five milligrammes of the tuberculin. This induced us to give him a still more careful physical examination. The bases of the lungs were made the especial object of most careful investigation, but to no purpose. Here, however, on the right side, at the level of the nipple, roughened breathing, prolonged expiration, and subcrepitant râles after the patient coughed could be made out. This is about the point where the upper and middle lobes of the right lung meet, and it is particularly at the edges of the pulmonary lobes that tuberculosis makes its way most successfully. This is probably because the circulation in this part of the lung, as in the apex, is very poor.

It must not be forgotten that this localization of pulmonary tuberculosis is not impossible even when the apices of the lungs are absolutely unaffected. The tubercle bacilli find a favorable nidus for growth here, very probably because of some vascular or bronchial anomaly in the affected lung. Autopsy has shown that in most of the cases occurring in this locality the part affected is the upper border of the middle lobe, though tuberculous infiltration has sometimes been found in the lower border of the upper lobe. Anteriorly this localization of the tuberculous process may usually be detected near the nipple or along a horizontal line passing through the nipple. Posteriorly it may sometimes be found, when there are no signs of it in front, along the lower border of the scapula. In searching for it in this locality the patient's right hand should be firmly placed upon the shoulder of the opposite side during auscultation.

It is in cases like these that tuberculin has shown itself to be so valuable as a diagnostic agent. It can do no harm when not used to excess, and it does enable us to form a definite conclusion in doubtful cases. Its greatest value lies in the fact that by it we are able to detect pulmonary tuberculosis with certainty in its very incipency. After all, it should be remembered that tuberculous lesions must attain a certain size, at least that of a cherry, before

their presence can be determined by percussion. The lesion must also be near the surface of the lung or bear certain favorable relations to a bronchus, or it does not betray itself to auscultation. It must also, as a rule, have begun to break down before the characteristic bacilli appear in the sputum. Before any of these conditions are fulfilled, the reaction to tuberculin will give positive evidence of the presence of a tuberculous process. The importance of this information is apparent when we remember that the prognosis of pulmonary consumption is favorable just in proportion as the stage of the disease at the time of the discovery is recent. For a radical change in the patient's habits of life in the incipient stage of the disease, more rest, a more liberal diet, a freer out-of-door life, plenty of fresh air in the living apartments, and freedom from responsibility and other sources of anxiety, offer the most favorable conditions for a cure of the disease.

According to the old German proverb, "After all, every one has a little tuberculosis" ("Wir sind alle am Ende ein Bischen tuberculös"). At autopsies after death from other causes we certainly find healed lesions of the disease often enough to show that the proverb is practically true. This fact serves to prove that nature can overcome the disease if she be but given a fair opportunity. If only favorable conditions be provided for nature's protective efforts early in the disease, its presence may never be suspected, and the only trace of the struggle will be the encapsuled nodule, a monument to nature's victory. Most people, however, are not in a situation to furnish nature with the sinews of war for the encounter with the deadly foe, before it has gathered strength and undermined the fortress of health and resistive vitality. An early warning of the presence of disease will, however, often enable patients to take proper precautions. For assured early diagnosis nothing is equal to the tuberculin test, and it must have a place in the armamentarium of all lung specialists.

We have here some slow-running cases of pulmonary tuberculosis in which there is a marked tendency to the formation of connective tissue. This prevents the rapid progress of the disease. We have in them one of the mysteries of pathology, a solution of which would be of inestimable value in therapeutics. For this formation of connective tissue represents a most effective agency in nature's protective mechanism. Could we but stimulate tissues to its forma-

tion, it would be a great step forward in the treatment of many infective conditions, but especially of the one we are now considering.

The next case is one of the class that presents a tendency to involvement of the pleura, with all the discomfort for the patient that this complication involves. In all cases of pleurisy, as well as in every other inflammation, the indication is rest for the inflamed parts. For this purpose we have strapped the patient's thorax on the affected side with adhesive plaster, thus securing greatly diminished respiratory excursions. It must be borne in mind not only that this acts as a palliative for the pleuritic pains, but that it is also in many cases a distinctly serviceable therapeutic measure for the consumptive process in the lung. In America attention has recently again been called to the fact that putting a lung affected by tuberculosis absolutely at rest by the injection of an indifferent gas, such as nitrogen, into the pleural sac may be curative in its effects. Attention was called to the same thing in Italy some years ago. In chronic cases of tuberculosis this setting of the lung virtually at rest may be accomplished by the use of adhesive straps. After their application for a week or ten days the condition of the lung beneath them will always be found to have improved. In this case we are applying them for the second time. There has been not only much relief of pain from their use, but the cough has been much less racking and the patient has rested better.

Nearly every case of pleurisy is tubercular in origin. That such a thing exists as a simple serous pleurisy—that is, an inflammation of the pleural surfaces, with an exudation of a serous fluid, that is not due to microbic invasion, but consequent upon simple mechanical or circulatory factors—is very doubtful. Certainly most of the cases that were formerly placed in this category were unquestionably caused by an invasion of the tubercle bacillus. It is true that there are very few bacilli in these cases. It may be impossible to demonstrate them by staining methods and the microscope, even after the most careful sedimentation or the use of the centrifuge. The injection into susceptible animals of the fluid obtained from the pleural cavity of cases that were regarded as simple serous pleurisy has often shown that tubercle bacilli were present, for the animals died with the manifest lesions of tuberculosis.

It was at one time taught that a pleurisy was probably tubercular only when the fluid obtained by puncture was hemorrhagic in character, or at least stained with blood. In the light of our present knowledge every case of pleurisy must be looked on with suspicion and the same precautions taken as when tuberculosis is known to be present.

We have next, in these beds, a series of rheumatic cases. It may be a surprise to some of you that we have these cases in the department for infectious diseases. For we have been accustomed to regard rheumatism, even the acute form, as the manifestation of a diathesis, an acidæmia due to the presence of an excess of certain organic acid substances in the circulation. Of late, however, we have come to realize that acute rheumatism presents all the characteristics of an acute infectious disease. The specific microbic cause of this affection has not yet been definitely determined, though a number of microbes have been found that seem to bear an etiological relation to the disease. It is not unlikely that several different forms of rheumatism will be found to coexist in the class of cases that we now designate simply as acute rheumatism. There has been in recent years a separation of various forms of arthritis from the group of diseases that were formerly called rheumatic. The differentiation has been especially easy in those arthritides which follow the infectious fevers.

While studying rheumatism as an infectious fever, we have been especially interested in the cardiac complications that so often attend it. After all, an attack of acute rheumatism would be a matter of but little moment, were it not for the dangerous disturbance of the valvular mechanism of the heart which it involves. There would be a few days of pain and discomfort, a week or so of convalescence, and that would be the end of it. All the various forms of arthritis that we have learned in recent years to differentiate from simple rheumatism show the same liability to affect the heart. Gonorrhœal rheumatism, with its curious tendency to attack only one joint at a time, a symptomatic idiosyncrasy that is almost pathognomonic of this affection, is no exception to the rule. We have come to regard arthritis as being due in most cases to the presence of an infectious agent in the blood. Serous membranes of whatever form are liable to involvement, and we are therefore not surprised to find tendon and muscle sheaths as well as meninges attacked by

the specific virus. This view of rheumatism, as an infectious disease, will undoubtedly enable us to solve many of the obscure therapeutic problems connected with it much better than the old pathological assumption of an excess of uric or of lactic acids in the blood.

The cardinal indication for treatment of rheumatism is rest, the most absolute attainable. We also endeavor to secure remission of the fever in order to allay the restlessness which it induces, and require the patient to remain in bed for some time after the acute symptoms have subsided. This is necessary not only as a precaution against relapses, but also in order that the arthritic, and more particularly the cardiac, lesions of the disease may have ample opportunity to undergo regressive changes. Undoubtedly the greatest harm is done in rheumatic cases by permitting patients to go about after the disease has declared itself, and allowing them to get up too soon after the remission of symptoms has occurred.

We have next a series of cases under prophylactic treatment against a disease that you will not often meet, but of which it is very important that you should have some knowledge. It is probable that if a proper understanding of this disease obtained more generally, we would soon be able to stamp it out entirely. The affection is *lyssa* or rabies. At one time, here in Germany, it claimed perhaps a score of victims every year. Most of the sufferers came from the German provinces bordering on Russia. *Lyssa* is rather common on the Russian steppes. It is endemic among the wolves that haunt these vast Russian plains. From them it is communicated to the Russian dogs, and in this way the disease becomes widely distributed throughout most of Europe.

Injections with the emulsified spinal cords of rabbits which have been inoculated with the disease according to the method of Pasteur, undoubtedly confers immunity from the disease, after exposure, in practically every case. This method of prophylactic treatment has been given a thorough trial in Austria, in Hungary, and very extensively in Russia, and there seems to be no question as to its efficiency. Deaths from rabies still occur, even after the Pasteur treatment, but only in cases in which the treatment was begun too long after infection took place or in which the bites were on the face or head. Under both of these conditions the virus of the disease reaches the central nervous system and becomes fixed before the antidote can neutralize it.

Here at the Institute for Infectious Diseases, during the year that the Pasteur treatment has been in use (it was introduced in June, 1898) we have treated some two hundred cases of the disease, and we have yet to see a single instance in which the slightest untoward symptom occurred. Up to January, 1899, according to the official statistics, one hundred and thirty-seven persons had been under treatment here. All of these patients are alive and well, though we know that at least three deaths took place from the bites of animals under circumstances similar to those in which a number of our patients were bitten. Altogether during 1898 we have the records of two hundred and five subjects of the German Empire who were treated by the Pasteur method, for before the opening of the lyssa service here at Berlin a number of Germans were treated at Vienna, some at Cracow, and some at Paris. In none of these cases did the disease make its appearance.

The system of treatment we employ is essentially that of the Pasteur Institute at Paris, except that we are in the habit of using in almost all cases what is known as the intensive method, which in Paris is reserved for the very serious cases. Instead of beginning with the injection of spinal cords of inoculated rabbits that have been drying for fourteen days, we begin with twelve-day cords, and instead of concluding the treatment with cords dried for four days, we use those of the second day. This change was introduced partly because our animals are smaller than those used in Paris, and partly because we felt that the more recent cords afforded the best protection. The use of this method, which is also adopted in Vienna, seems amply justified by the results which we have obtained, and it clearly demonstrates the absolute harmlessness of Pasteur's method of treating this dread disease.

When in your practice, then, especially if it be in the country, you have cases that you suspect to be rabies, send them at once to the Institute to be treated. For the sake of protecting the public health, as well as for the possible comfort of the patient in case it is found that the suspected animal did not have rabies, the head of the animal, for it is in the central nervous system that the virus is localized, should also be sent to the Institute. If there is reason to suspect rabies in the animal, treatment should not be delayed until assurance is reached in the matter, for it must be remembered that the sooner treatment is begun the greater is the protection

afforded, and the less the danger that the disease will develop. We shall, I think, be able to tell definitely by the statistics of the Institute how long after the bite treatment may reasonably be expected to be successful. We hope shortly to be in a position to announce, as a result of our studies, a decided abbreviation of the Pasteur system of treatment, and also to describe a method by means of which animals may be permanently immunized against rabies by a single injection. This will, we think, enable us before long to blot out the scourge of rabies completely in Germany.

LEPROSY.

CLINICAL LECTURE DELIVERED AT THE CHARITÉ HOSPITAL, BERLIN, GERMANY.

BY PROFESSOR O. LASSAR.

GENTLEMEN,—I wish to speak to you to-day about a disease to which governmental measures have recently attracted universal attention, but which has not for several centuries past formed a theme of public discussion. I mean the disease which we call leprosy, taken from the Greek word “*Lepros*.” *Lepros Arabum* is the leprosy of our days, while *lepro Græcorum* is the malady now called psoriasis. The Arab regenerators of the medical science of the Greeks adopted these names, but used them in different senses, thus giving rise to some confusion; but I will not waste your time with these historical references, as they are treated of in all the text-books.

Leprosy seems once to have been a very well-known malady, as the frequent allusions to it in the Bible prove; but it has now fallen into comparative oblivion, being only referred to in general terms and never carefully described. The consequence is that most medical men now living know nothing about it, and even doubt its existence, or at least its practical importance. It has never died out, however, but has only been confined to countries outside the pale of civilization, and even there it does not play so great a part as in former times. It was brought to Western Europe by the crusaders, and gained so firm a footing there that it became a public danger, and the authorities had to exclude lepers from human society; hence the German word “*aussätzig*” (leprous), which originally meant excluded. It was noticed that the disease followed human intercourse, spreading from places where lepers lived, and this was the primary impression it made on the unscientific minds of former times. Draconic laws were enacted against it, and their execution was attended by ceremonies suggested by the half-conscious feeling that it was necessary to keep attention continually directed to it. The lepers were condemned, so to speak, to death in life, and led

away with ceremonies resembling those of a funeral. They lived in leproseries, "houses of St. George," or "hospitals of Lazarus." The German word "Lazareth" (lazaretto) is derived from the latter designation, which originally meant a hospital for people like poor Lazarus in the Bible, whose name has thus become immortal. Many of our German hospitals were originally houses of this kind. Of course, when there were no longer any lepers to take care of, the houses remained standing, and the Sisters of Mercy and religious orders who had done what they could for the lepers took to other work of the same kind, to the great benefit of public medicine. Leprosy died out, and this result is a brilliant example of what may be effected by public hygienic measures. One of the most terrible diseases that ever afflicted mankind was thus totally extinguished.

It would have been left in oblivion but for the united efforts of Daniellssen, of Bergen, and Buch, of Christiania, in the middle of this century. They made an exact study of the disease, which was at that time wide-spread in Norway, and we are indebted to them for that clear description which is now generally acknowledged to be a true picture of leprosy, a malady that shows different symptoms in individual cases, but is distinguishable from all other infectious diseases. Then the pathological anatomists took up the matter, the studies of Virchow have greatly increased our knowledge of the histology of the affection. Apart from what ancient tradition tells us, all the knowledge of leprosy which we possess has been gained in our own time.

The researches of Virchow seemed to satisfy the demands of science. Leprosy appeared to be restricted to poor populations outside the pale of general interest, and nobody dreamed of any danger whatever. But Professor E. von Bergmann, then at Dorpat, became aware of the existence of leprosy in Livonia, Courland, and other Baltic provinces of Russia. He wrote some excellent papers about his investigations and collected all the important facts that could be ascertained concerning it. Among other things he showed that the disease had become much more prevalent than formerly. He was aided in his researches by Wachsmuth, and these two men were the first to call attention to the steady progress of leprosy.

The general opinion at that time was that leprosy was not infectious, and the same opinion prevailed concerning other infec-

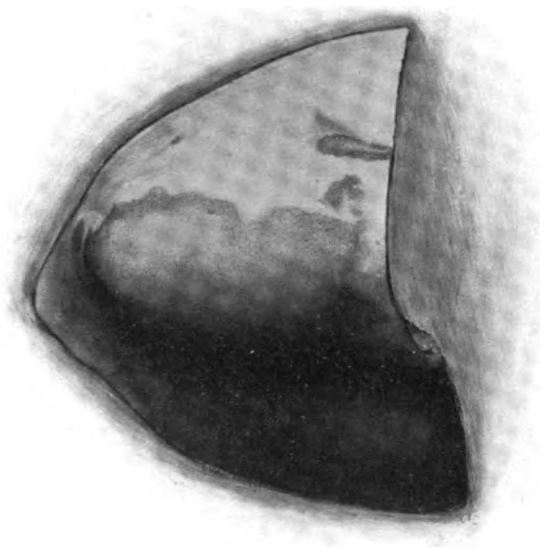


FIG. 1.—*Lepros Aeneolithicæ*. Ingebrecht, thirteen years old, from the vicinity of Bergen, Norway. Leprosy of about three years' standing. Parents healthy.



FIG. 2.—*Lepros Tuberosæ*. Plademærk, eighteen years of age, from the neighborhood of Bergen, Norway. Leprosy of two years' standing. A brother died of the same disease. Parents are in good health.

tious diseases,—tuberculosis, for example,—in which the fact of infection was not so obvious as in syphilis. Villemain, of Paris, taught the contagiousness of leprosy thirty years ago, but found no followers. Now, on the contrary, the French authors—Grancher, for instance—are foremost in demanding legislation to prevent the spread of leprosy. We see that the study of an epidemic disease is preparing practical weapons against it. Further investigations proved leprosy to be endemic in British India: thousands of lepers were found there, but Europeans were supposed to be immune.

Then came horrible news from the South Sea, after the beginning of Chinese immigration to the Sandwich Islands, and especially to Honolulu. Coolies were imported, and a frightful epidemic of leprosy at once broke out. One-tenth of the natives were infected, whereas in the beginning of the fifth decade of this century leprosy was utterly unknown in these islands. The same is the case with the population of Trinidad, where there are hundreds or thousands of lepers, either isolated or living with the rest of the inhabitants. Madeira and Egypt, too, were found to be infected.

Nobody had a precise notion of the number of lepers in the world, nor whether there were immune countries or not, but we now know that there is no country in the world free from leprosy. Foci of the disease or isolated cases are found everywhere, even in our own country, and this fact will seem less astonishing if we remember that in the Middle Ages leprosy was endemic all over Europe. As there was no striking example of infection, the general opinion was that leprosy was not infectious; but this opinion has now been abandoned. It was noticed, however, that the disease seemed to be hereditary in some families. The two Norwegians whom I spoke of gave pedigrees of families belonging to the yeoman class with cases of leprosy in each generation, and inferred that the disease was hereditary.

This theory of heredity left out of account the wretched social condition of the poor Norwegian peasants and fishermen, who lived crowded together in little huts. An English writer attributed the disease to the circumstance that they lived exclusively on fish. Now, though it cannot be denied that bad food develops a tendency to chronic diseases, there is another fact of much more importance in this connection,—namely, that coast people have more intercourse with foreigners than others. Leprosy follows traffic, as we see in

Russia, whence it crept from the Baltic to the plains of Asia and to Germany.

The literature of leprosy is increasing daily. Let me name one of the younger investigators, Dr. A. von Bergmann, whose monograph on the subject is very interesting. Dr. Ehlers, of Copenhagen, has discovered why foci of leprosy have developed in Bretagne. The Bretagne fishermen, he says, go to Iceland in their boats, live with the fishermen there in their small and dirty dwellings, and take leprosy back with them to France. To Iceland it was carried by the Norwegians, and from Iceland to America; but America got it from China, too. All the cases that have occurred near the Gulf of Mexico—at Galveston and New Orleans, for instance—are of Chinese origin. Direct proof of this cannot be given; but the facts that leprosy follows the lines of human intercourse, and that it was stamped out some centuries ago by isolation, show that man is the bearer of the contagion.

Of European lepers who have come from infected countries we are able to prove that they were in closer relations with the natives. The mere walking about of lepers, as of those suffering from syphilis, infects nobody. Syphilitic people live in the midst of a healthy population, and one may meet them on the railways, in beer-houses, indeed everywhere. There is no great danger if we know the disease. Though there is such a thing as "syphilis insontium," it is not frequent enough to justify fear. Syphilis establishes itself at the points of sexual contact, and without sexual contact there is not much likelihood of its transmission. But of leprosy nobody knew anything about either the beginning or the cessation. Now we know that, when the secretion of open leprosy ulcers comes in contact with a sound tissue, infection may occur. In Honolulu the general opinion is that Europeans do not become lepers unless they have sexual intercourse with Kanaka girls. It is possible, however, that this popular belief is erroneous, and that infection may take place by means of towels, linen, clothes, or contact with leprosy secretion in some other way. This has been pointed out by Arning, a man profoundly interested in leprosy, and proved beyond all doubt by Robert Koch. At last year's Leprosy Conference in Berlin numerous details were given showing the dangerous nature of the leprosy secretion of the nose and of other organs. It contains the bacillus, a visible cause of the disease.

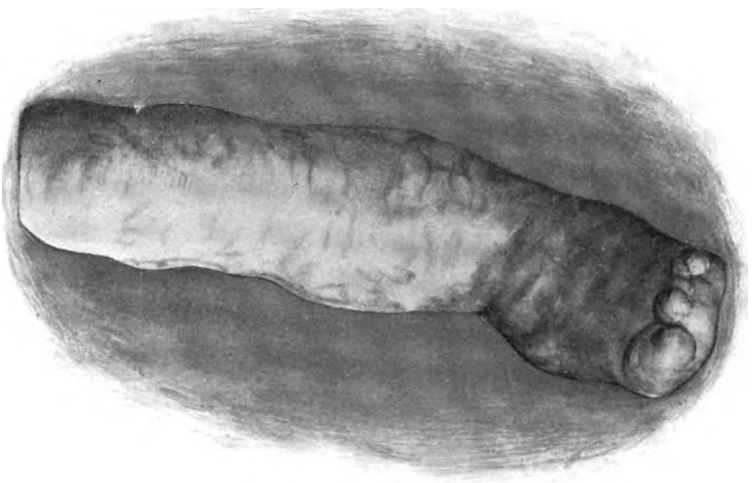


FIG. 3.—*Leprosy Anæsthetica*. Brigitte, single woman, forty-two years old, from the neighborhood of Bergen, Norway. Leprosy of about ten years' standing. Nothing known of parents.

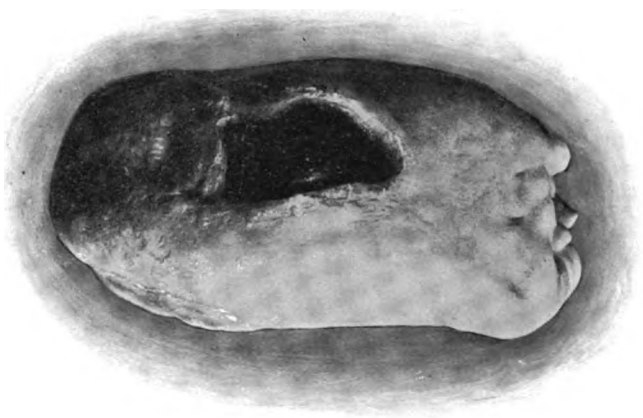


FIG. 4.—*Leprosy Ulcerosa*. Patient (name unknown) fifty-six or fifty-seven years of age, from the vicinity of Bergen, Norway. The ulceration is of forty years' standing. Nothing known of parents.



FIG. 5.—*Leprosy Maculosa, Tuberosa, et Ulcerosa*. Hermann Kilian, twenty-one years old, sailor, from Dorpat on the Russian Baltic. Leprosy of two and one-half years' standing. Parents sound. The first subjective symptoms noticed were formations over the skin of the entire body.

We knew of leprosy before we knew its bacillus, just as we know syphilis, whose bacillus is still unknown. Of course, the discovery of the bacillus of leprosy was a highly important gain for science. We owe it to Armauer G. Hansen, chief physician of a lepers' asylum at Bergen, who, though a man of great acumen, made his investigations with insufficient means and at an unfavorable time, and published his discovery in a language unknown to the scientific world at large. He *saw* the bacillus of leprosy in his microscopical sections, just as we can see it now, but he did not possess the bacteriological apparatus of our days. About the middle of the seventies he published a paper in which he said that leprosy processes were connected with bacilli in the tissues. This paper was printed in Norwegian, and escaped notice amid the mass of observations that were published at the same time.

Neisser, who applied Koch's staining methods to gonorrhœa and other diseases, made a journey in Norway, and applied gentian and methylene-blue to leprosy sections. In all he saw innumerable bacilli, the same that Hansen had observed, which are now called the Hansen-Neisser bacilli. Cultivations of these bacilli have never been obtained, and we cannot yet infect animals and study artificial foci in their bodies; but we find the bacilli in the tissues immediately adjoining the necrotic parts of tissue, and infiltrations and foci like gummata and tubercles. Then destructions of tissue ensue, inflammations and diseases of certain organs follow, and the newly formed tissues perish. From these various forms of attack different clinical aspects of the disease result; but these have only a symptomatic value, like the macular and papular forms of syphilis. In leprosy, too, sometimes the macular form prevails, sometimes the papular, but neither is altogether absent. In almost all of Hansen's cases the disease passed from the tuberous to the macular-anæsthetic form. The macular form is connected with alterations of the nerve-substance, and is a consequence of peripheral nerves being attacked, but not of that only. Yesterday we saw the nervus ulnaris thickened, with disturbed sensibility of a large surface of the skin in consequence. Perhaps we may regard these derangements also as brought about indirectly (the so-called neuro-lep-rides of Dr. Unna), the nerves being affected primarily and the skin secondarily. I merely hint here at the great series of questions

that are ripening for solution. The investigation of leprosy is still but in its infancy.

Leprosy is not a disease of the skin alone, like eczema: it is a disease of the whole body, like syphilis, from whose attacks no organ is exempt. The skin, the bones, the nerves, the visceral organs may all contain leprous nodules; none of the organs of special sense are exempt; and those of digestion and propagation may also be attacked. The eyes may become the seat of infiltration, and may also be endangered by the loss of sensibility in the region of the fifth nerve. Their vulnerability is great; a pannus leprosus may establish itself, and ectropium of the eyelids has been observed; in short, the danger of blindness is very great.

The process of destruction goes on step by step. We see the extremities mutilated, the eyes ruined, sensibility impaired in every direction, and the movements strikingly deranged. The patient loses the use of his limbs and the functions of the senses; he can no longer feed himself, and falls into marasmus. In the last stage of the disease he lives like a plant, with a body like a torso.

The process lasts ten years or more. I saw a patient in the Lundegaard Hospital, in Copenhagen, over fifty years old in whom the process had come to an end, leaving him a helpless wreck. Generally the disease takes a more rapid course. A part of the body remains sound, and the patient must try to make it serve him. For the most part, however, his efforts are vain. The severely damaged organism falls a victim to other diseases, especially tuberculosis. Syphilis predisposes to leprosy, and leprosy to tuberculosis. These three diseases greatly resemble each other; their effects on the system are very similar, and they help one another in their pernicious influence. Two of them are known to be bacillary diseases, and the most probable theory of the nature of the third is that it, too, is a bacillary disease. Their manner of spreading is the same. Medical men and the public at large ought to be well informed about them, for the purpose of strict prophylaxis.

Gentlemen, I could lecture to you for weeks on leprosy. In the three volumes containing the papers and discussions of the International Leprosy Conference held in 1898 in Berlin, you find reports of inestimable value by investigators in all parts of the world. But we need not study leprosy so intensely, for there are other forms of disease common in our own country, which we can study

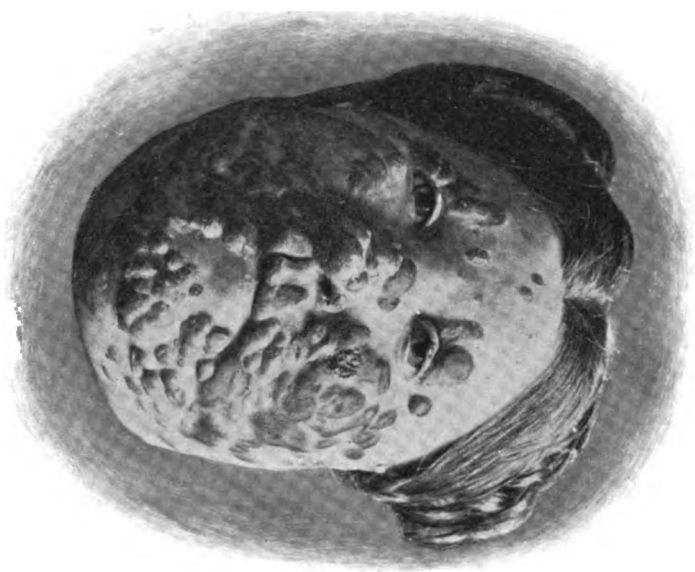


FIG. 6.—*Lepros Tuberosa*. Katharina Masler, from Memel on the Russian Baltic. Photograph taken at the Charity Hospital in Berlin. Patient was the first inmate of the Home for Lepers, established at Memel by the Russian government. The disease has existed since childhood. Parents (fisher-folk) are healthy.

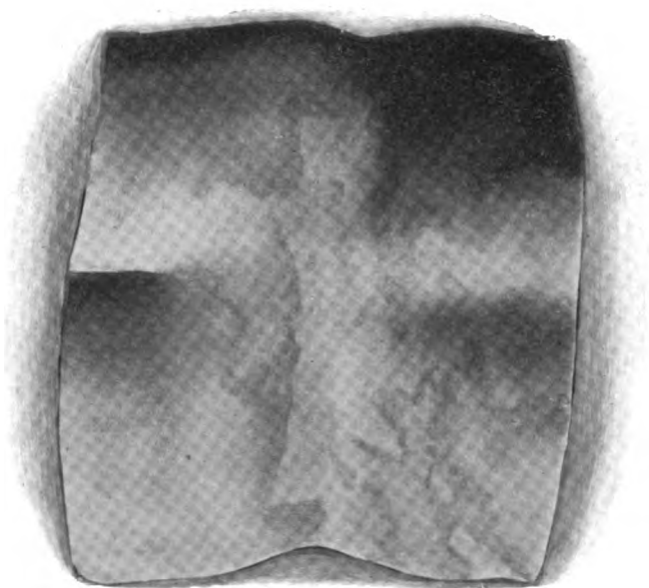


FIG. 7.—*Lepros Maculo-Anæsthetica*. Ode Schögen, forty-two or forty-three years of age, tailor, from Old Russia. Does not know how long the disease has existed.

with our own eyes. My preparator, Mr. Kasten, has studied all the typical forms of leprosy in Norway and in the Baltic provinces of Russia, and made embossed and painted representations of all the diseased parts, forming a visible synopsis of all the phenomena of this disease from the slightest, hardly perceptible, alterations to the most terrible destructions. These preparations are copied from life, and my collection is unique among private collections of this kind. I have offered it to the Prussian Government, which is anxious to accept the gift as soon as a suitable form of presentation can be found. A number of photographs taken from these models show better than words can describe the different varieties of leprosy.

GASTRIC ULCER AND ITS TREATMENT.

CLINICAL LECTURE DELIVERED BEFORE THE MISSISSIPPI VALLEY MEDICAL
ASSOCIATION.

BY JOSEPH M. PATTON, M.D.,

Professor of Clinical Medicine in the Chicago Policlinic, Chicago, Illinois.

GENTLEMEN,—This young woman is nineteen years old. She has just been discharged from the hospital department, where she has been under treatment for the last twenty-five days. She was suffering from gastric ulcer when admitted, and exhibits a satisfactory result of the treatment of this disease by rest and rectal feeding.

The history of her case is as follows: Two months ago she presented herself complaining of severe gastric pain after taking food, occasional vomiting, and marked loss of strength. There has been no hæmatemesis nor has the vomited matter exhibited hyperchlorhydria. Test-meals and the stomach-tube, however, have not been employed. There is no history of blood in the stools. No objective evidence of a tumor, local induration, or peritonitis could be obtained, though there was marked epigastric tenderness near the median line down to the ensiform process,—the epigastric point as described by Brinton,—and also in the dorsal region an inch to the left of the two lower dorsal vertebræ,—the dorsal point of Cruveilhier. The gastric pain was the severe, paroxysmal, gnawing, burning pain characteristic of ulcer, at first occurring only in connection with the ingestion of food, but later becoming more or less constant, with periodical exacerbations incident to the irritation from ingested material. The patient's employment in one of the large department stores of this city necessitated her being on her feet all day. This she became unable to do, because of increasing weakness and constant pain. Diet and medication afforded only temporary relief.

Twenty-five days ago she was placed in the ward up-stairs. Absolute rest was enjoined, and she was not permitted to leave her bed.

For the first few days she was allowed nothing by the mouth, except two or three sips of water. Her rectum was flushed out every morning, and four times in every twenty-four hours she was given an enema consisting of one teaspoonful of somatose, five ounces of milk, two ounces of water, and a pinch of salt. This treatment was continued for eighteen days, no nutriment or medicine being given by the mouth except a few four-grain benzosol powders for the relief of flatulence. During the first four days she suffered slightly from hunger and thirst, but afterwards was quite comfortable in this respect. The pain disappeared entirely after four or five days. On the eighteenth day she was allowed three ounces of milk every four hours, and the nutrient enema was given but twice in twenty-four hours. On the twentieth day she was given bread and milk with a little potato, and the rectal feeding was discontinued. It is surprising how well her strength has been maintained. She now eats plain food without discomfort and is rapidly gaining strength. She is at present taking ten drops each of the tasteless tincture of iron and the tincture of nux vomica thrice daily. She will soon be able to return to her work.

This case illustrates the course of a typical, simple gastric ulcer towards a favorable termination. Ulceration of the gastric mucosa may be incident to the progress of other diseases of the stomach, such as acute or chronic gastritis, neoplasms, tuberculosis, syphilis (rare), or typhoid fever. Primary ulceration may be due to bacterial infection, as in anthrax, or may occur in tuberculosis and syphilis.

The so-called round, simple, chronic, perforating, corrosive, ro-dent, hemorrhagic, peptic ulcer of the stomach is a sharply outlined destructive process situated primarily in the mucous membrane, with a tendency to involve progressively the deeper structures of the stomach wall. It occurs in all conditions of life. Various observers state that collected autopsies show the presence of ulcers or scars in a proportion varying from one and a half to ten per cent. Simple ulcer of the stomach is rare before the tenth year of life. More than half the cases develop between twenty and thirty; after the age of forty it is not common, though the greatest mortality is said to occur between forty and sixty. In old age ulcer of the stomach is a fatal disease. Women are more subject to simple ulcer of the stomach than men, in the proportion of two to one or of three

to one. After the age of fifty ulcer occurs most frequently in men. Ulcer has a generally recognized association with chlorotic and hysterical conditions in women; while arteriosclerotic states in men may have some bearing on the frequency of ulcer in that sex after the age of fifty.

The comparative rarity of gastric ulcer among the peasantry of certain portions of Europe is referred to by those who place particular stress on the etiological relationship between diet and gastric ulcer. It is not apparent, however, that either age, sex, occupation, environment, diet, social or financial conditions have more than a predisposing influence on the occurrence of this malady. The influence of cardiovascular diseases in giving rise to local conditions in the stomach wall, such as embolism, thrombosis, infarction, arteriosclerosis, aneurisms, local inflammations, etc., which may result in ulceration, cannot be disputed, though there are those who attempt it on the ground that the period of life at which cardiovascular lesions occur is not at all coincident with that at which the development of gastric ulcer most frequently takes place.

While blood conditions, such as chlorosis, oligocythæmia, etc., cannot be directly charged with the genesis of ulcer, such conditions are undoubtedly responsible, in many instances, for the failure of the ulcer to heal. The bacterial origin of ulcer may be admitted only in the sense that ulcer may be associated with circulatory affections, but the etiological bearing of the presence of bacteria in the walls of the ulcer is not apparent. The causative relation of hyperacidity to ulcer is an enticing theory, in that we can easily deduce from it functional inability, loss of vitality, autodigestion, circumscribed loss of tissue, imperfect efforts at repair, etc. You will note, however, that hyperacidity occurs in only about seventy per cent. of the cases of ulcer, and that this lesion is found most frequently on that portion of the stomach wall which is comparatively free from the action of the gastric juice. Moreover, it is neither the condition of the blood, the digestive glands, nor the presence of mucus that prevents autodigestion, but the properties of living cell protoplasm. Excessive acidity, however, may have a strong predisposing influence in the production of conditions which result in ulceration.

We see, then, that ulcer of the stomach is the result of various causes which impair the circulation in and the nutrition of local

areas of the stomach wall, and through these defects lessen their power of vital resistance to the irritating influences of changes in the composition of the gastric secretions as well as to motor disturbance from the parts themselves.

Simple ulcer of the stomach usually occurs singly, though in about fifteen per cent. of autopsies there is evidence of more than one. The localities in which ulcers usually occur are the posterior wall, the smaller curvature, and the pyloric region. They are less frequently found on the anterior wall, in the cardiac region, or along the greater curvature, and are rarest in the fundus. About forty-five per cent. of the cases are said to occur in the pyloric third of the stomach.

The typical ulcer is round or oval in form, and varies in area from the size of a pea to that of a quarter of a dollar. It may be much more extensive and, through coalescence of two or more ulcers, may be quite large and variously shaped. The pylorus is sometimes surrounded by a ring of ulceration. The long axis of the ulcer corresponds in direction to the course of the artery supplying the involved area. The edges of the ulcer are regularly curved, the mucous border being perpendicular or undermined. It has a punched-out appearance. The border may be red and œdematous, or hard and indurated. When the ulcer involves the submucous and muscular layers, it has a conical or funnel shape; the different tissues sometimes present a terrace-like formation. The neighboring blood-vessels show changes characteristic of progressive, proliferating endarteritis. The apex of the ulcer may rest on some adjacent organ, frequently the pancreas. In most cases the exudate of concomitant plastic peritonitis is deposited around the apex, a natural protective process, and in many cases it binds the stomach to some adjacent tissue. Perforation of the stomach wall occurs in about five or six per cent. of the cases. Ulcers situated on the anterior wall perforate most frequently, and before the formation of adhesions; they are, therefore, often followed by death from shock or purulent peritonitis. Death in such cases may occur very suddenly.

Ulcers of the posterior wall, lesser curvature, or pyloric region do not usually perforate before adhesions have formed. The perforation may be very small, but can be quite extensive: in one case which I recall there was a rent an inch or more in length in the

centre of an area as large as the hand, where the stomach wall was as thin as paper. As a result of perforation, there may be local or general peritonitis, subdiaphragmatic abscess, usually on the left side, or the adjacent organs, tissues, or vessels may be affected. If perforation does not take place, the ulcer heals, unless some accident, such as a fatal hemorrhage, occurs.

The symptoms of simple ulcer are very variable. Many cases run their course and heal without a suggestion of its presence, the symptoms being such as might justly be attributed to functional disease of the stomach. Pain, hemorrhage, and vomiting are the cardinal symptoms in the order of their actual frequency. Clinically, we are often obliged to place vomiting second, because small hemorrhages are apt to be overlooked. The pain may be of any degree of intensity. It is less remittent than in any other organic disease of the stomach. It is directly related to the irritating motion of the food, but the time of its occurrence has no necessary relation to the situation of the ulcer. Certain positions of the body may be unusually painful, according to the location of the ulcer and of the adhesions. Vomiting usually occurs from half an hour to an hour and a half after eating. Coarse food is most apt to induce vomiting. If the stomach is emptied, the pain is lessened. Hemorrhage is largely an accidental occurrence, and is frequently so slight as to escape notice. If the blood passes into the bowel, it is frequently overlooked, unless careful search is made for melæna. Sudden collapse in young women who have had gastric disturbance should arouse a suspicion of hemorrhage. Hæmatemesis occurs in from thirty to fifty per cent. of the cases, and the more copious the hemorrhage the more characteristic it is of ulcer.

The objective signs are the gastric and dorsal tender points and the presence of a palpable tumor or indurated area. It has been said that the presence of a gastric ulcer can always be detected by palpation, but the only instance in which I have been able positively to locate the lesion by this means was in the case of a young woman who had an ulcer on the anterior surface of the stomach, near the pylorus, which had caused local peritonitis distinctly palpable over an area about one inch in diameter. Functional evidence of ulcer may be obtained by examination of the vomited matter, which in sixty or seventy per cent. of the cases shows hydrochloric super-

acidity. The stomach-tube is dangerous in these cases, and without it the functional signs lose some of their value.

We have not time to consider the question of differential diagnosis, which is not always as easy as might be expected from the case before us, especially when we remember that five per cent. of the cases of carcinoma of the stomach develop on the borders of an ulcer, or in the cicatrix that it causes.

In ulcer of the stomach much can be done towards hastening the cure, and also towards preventing its recurrence, by attention to the predisposing and exciting causes, and by treating the associated anæmia and hyperchlorhydria. The stomach should be relieved from all irritation and should be given functional rest; nutrition must be maintained, and symptoms and complications are to be treated as they arise.

Among the routine methods of treating ulcer of the stomach we may notice the method adopted in this case,—*i.e.*, by rest and rectal feeding. I do not think this method is suitable for all cases, but for a patient with a simple, uncomplicated ulcer, having a sound constitution and in good general health, I think it may be an ideal method. In many cases this plan of treatment may be adopted for a few days where pain and hyperchlorhydria are persistent. Marked inanition may contraindicate its employment. Nutritive enemata constituted according to the directions of Leube, Boas, or Ewald are very useful, but I believe are no more so than the one used in this case, while they are more troublesome to prepare and are not as well tolerated by the patient.

The method of Débove consists of a diet exclusively of milk, from two to two and a half litres of which are allowed daily, a glass being given undiluted every two hours. All hydrochloric acid secreted is neutralized by a powder containing ten grains of sodium bicarbonate and three grains of prepared chalk, administered every four hours during the day, and a dose at night, also, if there is pain. Again, three glasses of milk may be given three times a day, and a powder every half-hour for three hours succeeding each meal, and every hour for the remainder of the day. After a week or two meat and cereal powders are allowed, and later on the amount of aliment is increased. The alkaline powders, with the addition of three grains of calcined magnesia if the bowels demand it, are

given every half-hour for the three hours succeeding meals for several weeks after pain and vomiting have ceased.

The rest and Carlsbad cure consists of more or less absolute rest in bed according to the view of the physician, and the administration of Carlsbad salts. Von Ziemssen forbids over-exertion; allows milk, meats, broths, and white bread. From two to four drachms of artificial Carlsbad salts, dissolved in a pint of hot water, are taken in four doses at fifteen-minute intervals. The liquid is to be drunk slowly, and the last portion is to be taken half an hour before breakfast. One or two stools are desired. If there is hyperchlorhydria, Vichy may be taken at night. After three or four weeks the salts are stopped, but the mineral water is continued for a few weeks. The abdomen is protected by flannel. Leube enjoins absolute rest in bed; hot compresses over the stomach during the day; a Priessnitz compress at night, or ice-cold compresses if there is hemorrhage; and a glass or a glass and a half of Carlsbad water (Mühlbrunnen), containing from one to one and a half tablespoonfuls of artificial Carlsbad salts, daily one hour before breakfast. At first the diet consists of meat solutions given in warm bouillon or in milk. After two or three weeks thickened soups, bread, purée of potatoes, chicken, squabs, etc., are allowed. This method is useful, though in conditions of marked anæmia the continued use of Carlsbad salts may not be tolerated.

In the general management of these cases milk is the best diet. The quantity for twenty-four hours should not exceed two quarts. It should not be skimmed; one glass or less may be given every two hours. Milk sugar may be added once a day after the pain and vomiting subside. Some wheat preparation may be added to the milk, or meat broth, or raw egg may be given. The usual diet should be resumed very gradually. Hyperacidity should be corrected by sodium bicarbonate, calcined magnesia, and prepared chalk. These may be combined so as to control constipation or temporary diarrhoea. From fifteen to thirty grains of soda, with the necessary amount of magnesia or chalk, may be given in powder after each glass of milk. Nitrate of silver is a valuable remedy in gastric ulcer. It relieves the pain and vomiting, not by any specific action on the ulcer, but because of its effect on the gastric secretions. One-fourth of a grain may be given in a little distilled water half an hour before the morning meal. A one- to two-thousand solution

is recommended as a douche for the stomach in troublesome cases with no history of hemorrhage. Bismuth is a much-vaunted remedy for gastric ulcer. The subnitrate is the preparation usually employed. One or two drachms are given in a glass of water in the morning. The patient may be placed in different positions, in the hope that the bismuth will by this means be brought in contact with the ulcer. The bismuth may be introduced through the stomach-tube after washing out the stomach, but this method does not appear to have special advantages. The administration of this drug should not be continued for a longer period than two weeks, for fear of poisoning.

For the gastric catarrh, so often a troublesome feature of gastric ulcer, Ord recommends a five-ounce mixture containing potassium iodide, thirty grains; sodium bicarbonate, seventy-five grains; dilute hydrocyanic acid, three drops; gentian root, forty-five grains (infusion). A tablespoonful to be given three times a day.

Hemorrhage is to be treated by rest in bed, rest of the stomach, an ice-bag over the stomach, morphine hypodermically, ergot hypodermically, and bandaging of the extremities. Drugs and cold drinks should not be put into the stomach. Lavage with ice-cold water may be tried in extreme cases.

Collapse is to be treated by the recumbent position, elevation and bandaging of the limbs, the rectal and subcutaneous injection of salt solution, the hypodermic use of ether and camphorated oil, and by transfusion.

Morphine injections or opium suppositories may be necessary for pain, or one-half grain of codeine and fifteen grains of sodium bromide may be given in laurel-cherry water. If vomiting is persistent, absolute rest of the stomach is necessary, at least for a time.

Local peritonitis is to be treated by absolute rest of both body and stomach, cold over the epigastrium, and sufficient morphine to relieve pain and prevent peristaltic movements.

Perforation is to be treated medicinally by the same measures more energetically employed. Perforation, unless preceded by limiting local peritonitis, converts the case into a surgical one, and the earlier the operation is done the better.

We will not consider the surgical features of ulcer and its complications. Surgical intervention discovers possibilities in some of these desperate cases which a few years ago were not thought of.

In respect to the treatment of the class of cases to which our patient belonged, I wish to impress upon you the futility of therapeutic measures unless the amount of exertion made by the patient can be controlled and absolute rest can be enforced if necessary. Absolute rest of the body and stomach is a factor of the utmost importance in these cases, as illustrated in this patient; and, if declined by the patient, the physician may not be warranted in assuming the responsibility of treatment.

THE NECESSITY FOR ISOLATION AND HOSPITAL CARE FOR POOR CONSUMPTIVES.

BY J. C. WILSON, M.D.,

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TWENTY-FIVE years ago Ruehle, a famous physician of Germany, Director of the Medical Clinic at Bonn, wrote concerning pulmonary consumption the following words: "The importance of laboring to check the spread of this deadly disease and to diminish the number of its victims has never seemed to be so urgent as at the present time, when there is a growing demand for more attention to the preservation of health and when the conviction is gaining ground that this is the main function of medical science." These words are emphatically true to-day; yet the learned writer, in his elaborate article upon pulmonary consumption in Ziemssen's *Cyclopædia*, immediately added, "It were idle to suppose . . . that we shall ever be able to extirpate consumption from the human race."

Fortunately for mankind, this gloomy prediction has, with advancing knowledge, lost its impressiveness. In 1882, seven years later, Robert Koch revealed to the world the actual cause of the tuberculous diseases, including pulmonary consumption, in the tubercle bacillus. This discovery marked a new era in medical history. With it bacteriology assumed an established position among the medical sciences. With it the mystery that surrounded pulmonary consumption came to an end. Doubts and uncertainties remained and still remain, but the matter passed from the region of uncertain hypothesis to that of scientific fact. Pulmonary consumption ceased to be an unknowable scourge, due to manifold, adverse, obscure conditions, and presented itself in the simple aspect of a chronic infection caused by a definite pathogenic principle, transmissible from individual to individual.

As this view concerning the nature of the disease became more clear, the three great stumbling-blocks which had stood in the way of the advance of knowledge relating to the disease were removed.

These were, first, the doctrine that pulmonary consumption is essentially hereditary; second, that it is incurable; and, third, that as a scourge of the human race it is ineradicable.

The medical profession is to-day in the position to assert, first, that the disease, except under rare and unusual circumstances, is not hereditary, and that in fact the vast majority of cases arise in consequence of infection by the tubercle bacillus,—that is to say, the transmission of the exciting cause of the disease from the sick to the well; second, that the tuberculous diseases, including pulmonary consumption, cannot in the present state of knowledge be regarded as incurable, but that a majority of the cases are, if seen early and placed under favorable conditions, amenable to treatment and capable of being restored to health; under these circumstances the individual case ceases to be a focus or source of infection; and, third, it naturally follows that the tuberculous diseases, which cause one-seventh, or fourteen per cent., of the deaths in the civilized world, may, by the general enforcement of proper sanitary regulations, be stamped out, or at all events enormously restricted in their prevalence. Facts familiar to the student of medical history in regard to the plague in Western Europe, to leprosy in the British Islands, and to typhus fever justify this assertion. There are those who will address you to-night who not only believe that pulmonary consumption and the other tuberculous diseases may be ultimately stamped out, but who are even sanguine enough to hope that this blessing to humanity may be brought to pass during, and constitute the crowning achievement of, the coming century. I cannot say that I wholly share in this sanguine expectation, but the time has arrived when the civilized world should be aroused from its apathy in regard to the subject.

The individual suffering from pulmonary consumption becomes a focus of infection, and in a very definite way. Whether the case be acute or chronic, so soon as necrosis of the lung occurs,—that is, so soon as ulcerative processes develop,—tubercle bacilli are thrown off with the sputum. This organism is practically an obligate parasite, growing and developing freely within ranges of temperature not very greatly exceeding that of the bodies of animals, and requiring moisture and oxygen. Nevertheless, under favorable circumstances, outside of the body it preserves its vitality and capacity for new growth for a considerable period. While the expectoration

remains moist or when it is discharged into vessels containing water, it is innocuous, for the conditions in which the expectoration in the moist form is conveyed to the interior of the bodies of susceptible individuals are exceedingly limited. When, however, the expectorated matters are allowed to dry in handkerchiefs or upon the clothing of the patient, or upon the floor of the room which he occupies, they are ultimately converted into particles of dust, and floating in the atmosphere are inhaled by other individuals in the vicinity. These are familiar facts. They of themselves suggest practical measures of prophylaxis. The people must be taught that the disease is a transmissible one, and that in the vast majority of instances transmission is indirect by means of particles of dried sputum containing the tubercle bacilli and floating as dust in the atmosphere. They must be taught that the chief measure of safeguarding those in the neighborhood of the consumptive consists in the collection and destruction, preferably by fire, of the sputa. They must be taught that the disease is not necessarily an incurable one, but that if taken in time a majority of the cases, probably a large majority, are amenable to treatment. They must be taught that it is better for a man suffering from a beginning consumption to give up his work and place himself under proper conditions to be cured than to struggle on, working until he breaks down beyond hope of cure. The consumptive in the mill, in the factory, in the office, in the school, in the sweat-shop, in the church, in public places of amusement and recreation, and in his home is a menace to the health of those surrounding him. He infects localities, he renders baleful the atmosphere in which float the dried particles of his expectorated matter.

The period of incubation of pulmonary consumption is often a long one. It is rarely possible to trace the direct connection between the infecting sick person and the well person who receives the infection; hence arise difficulties that surround the question of transmissibility. But the closer the matter is studied the less important these difficulties become.

It is worse than useless to teach the people, especially the working people, the facts concerning the spread of tuberculosis and not to point out the remedy. It is cruel.

The remedy is a very simple one. It is based upon the simplest principles of preventive medicine. It demands the fulfilment of a

public duty. State and local governments provide and maintain institutions for the care of the poor, and especially for the care of the sick poor. But the consumptive of the laboring classes, when he most requires help for himself and safeguarding for the public, is usually neither sick nor poor. Before long he is both and also the cause of sickness and poverty in others. Then he is commonly past help. At no time is the almshouse or the general hospital the place for him.

Asylums are provided for the insane, in order that the curable cases may be properly treated, the incurable suitably detained, and society protected against the violent or homicidal. The danger from the lunatic at large is an episode; that from the consumptive a scourge. Hospitals are established for contagious diseases, incidentally that the sufferers may be cared for, primarily for the protection of the people and the prevention of epidemics. The welfare of the people has made it proper to throw around these institutions and those who are proper subjects for admission to them the protecting arm of the law. Yet the consumptive, whose need is sorer as his number is greater, turns in vain for help. If in any great community small-pox or diphtheria or yellow fever were to prevail to the tenth part of the ordinary number of cases of consumption, depopulation would at once take place; the people would not stay.

Among well-to-do people the danger is comparatively slight. Education, refinement, and decent ways of living are safeguards. Such people can avail themselves of travel, of health resorts. For them long journeys and favorable localities are practicable. They can go to Görbersdorf, Falkenstein, or Nordrach. For them the regular supervision of competent medical men is possible, with constant attention, proper diet, courses of medicine, treatment in emergencies, hygienic conditions, and agreeable surroundings. For the poor consumptive all these are wanting. For him there is only the daily struggle to the end, with disaster not only to himself but to those about him.

The establishment of special sanitariums to which the incipient cases can be sent, and special hospitals for advanced cases, is the solution of the problem. A patient within the curable period should be sent to such an institution, not on commitment but voluntarily, for in such a plan only is his hope—hope for himself and for those around him. The earlier he goes the greater the hope of cure.

There are difficulties, but they are not insurmountable. Such institutions can be built in any climate, in any well-drained upland locality. There are sentimental difficulties, but these will lessen as knowledge increases. We cannot exalt the feelings of the individual above the safety of the community. The question of arrest of earning power is a difficult one. But the incipient case in many crafts can still work in the sanitarium, and new methods of insurance covering such cases are to be thought of. If we are to arrest the progress of this great scourge, special institutions for the care of tuberculous diseases in the working classes and the poor, at all stages of the disease, are imperatively necessary.

Neurology

A CLINICAL STUDY OF PARESIS.

CLINICAL LECTURE DELIVERED AT THE SOUTH SIDE HOSPITAL OF PITTSBURG.

BY C. C. HERSMAN, M.D.,

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Medical Department, etc.

THIS disease is also known as paretic dementia, paralytic dementia, general paralysis of the insane, and progressive general paralysis. A more accurately descriptive name for the affection would be "paretic ataxia of the insane with dementia," on account of the similarity it bears in many of its phases to locomotor ataxia, to which reference will be made later. Some writers class it with the insanities, but it is not a psychosis any more than a neurosis.

The pathological process involves brain, spinal cord, and peripheral nerves in many cases. Dercum says that the disease is accentuated in the brain, but in all cases distinct spinal lesions are present. This statement may be somewhat extravagant, although in some cases the spinal lesion antedates that of the brain.

The disease is very serious and is progressive in character. Its degenerative nature necessitates an early recognition. Bannister and Morel-Lavallee hold it to be a toxine disease. As to the nature of the pathological process there are two theories,—first, that primarily it is an interstitial inflammation; second, that it is parenchymatous.

There is in every case an initial period which antedates the disease, but, as a rule, the exact time of its onset can only be approximated. The earliest signs which may precede psychical changes are those present also in tabes,—reflex pupillary immobility, absence of patellar reflexes, lightning pains, optic atrophy. If in a

general way it is noticed that the patient is not well, if he looks bad, is not careful in business, and has changed in manner, there is cause for alarm. There may be inability to apprehend, comprehend, and remember, especially details. The patient's intellectuality is blunted, his sense of obligation to his family is lessened, and I have seen cases in which the animal nature predominated and gross intemperance supplanted the most moral conduct.

Experience teaches that in the majority of cases the beginning of paresis is not recognized by the attending physician. Hence when the patient is received at the hospital, sanitarium, or clinic, the disease may be well advanced. Hoche, of Strassburg, says this is due to deficiency in diagnostic ability, lack of psychiatric knowledge, slight practical perception for morbid mental states, defective medical instruction and examination, and special difficulties which always attend the early diagnosis. The psychiatrist himself often finds it necessary in the early stages to punctuate his diagnosis with an " ?" But, however difficult, it is as necessary for the general practitioner to have an opinion, to make a correct diagnosis, as it is for him to be able to reduce a dislocation or set a broken bone.

The most constant symptom is progressive mental enfeeblement, and in many cases it is the most prominent symptom to the end. Again, there are the grandiose delusions, hypochondriacal and melancholic aberrations, intensified psychical excitement, paroxysmal clouding of the consciousness, temporary defects in motor and sensory manifestations in the cord and brain, usually followed by a sinking of the intellectual level. These symptoms may at first be caused by temporary disturbances in the cerebral circulation, small hemorrhages, or local degeneration of the nerve elements.

Heredity is given as a cause, but some authors believe the predisposition to be more often acquired. Heredity is thought to be more frequently traced in the female than in the male, and consanguinity no doubt predisposes. Dercum gives plumbism and excessive use of tobacco as causes of paresis, and they may be either predisposing or exciting causes. He also says that paresis is never met with as an outcome of neurasthenia or hysteria. As to neurasthenia, exceptional cases will be found. The symptoms of the initial stages often lead to a diagnosis of neurasthenia. In fact, the early manifestations of the disease, according to Peterson, may be neurasthenic in character or may combine the symptoms of neurasthenia

and hysteria. The influence of race is marked. As yet the Asiatic is exempt, and, so far as I am able to learn, the savage is free, and the Irish and Scotch must come to the cities or to America to acquire it.

Females are not liable unless they drink bad whiskey and live dissipated and excited lives, as in the cotton manufacturing districts of England. Women in the higher walks of life are almost free from it. The Durham (England) miner when earning good wages furnishes the most favorable conditions yet known for paresis. Statistics show that every sixth lunatic admitted to the Durham County Asylum is a paretic. Time of life from thirty to fifty-five is a predisposing cause. Under twenty-five years of age, the disease is rare, although cases have been reported in patients eighteen, sixteen, fifteen, and even only eleven years old. Hard study, severe mental shock, traumatism, or continuous anxiety may produce it. The relative frequency in the sexes in this country is about as one to four, men, being more dissipated and subject to severer mental strain, presenting the greater percentage. The studies of Spitzka among the pauper insane in some of the eastern hospitals showed that Anglo-Saxons headed the list in point of number, the Celts coming next, and then the Germans and Negroes.

Syphilis combined with the different forms of dissipation I believe to be the most fruitful cause. I have seen very few cases in my hospital or private practice that did not have a suspicious history, to say the least, and many of them gave a positive specific history. On the other hand, I have seen a number of syphilitic cases which were pseudo-paretic only, but which would have been regarded as paretic by the casual observer. Sexual excesses I believe to be a very infrequent cause, from the fact that we have no rule by which to gauge excesses. Excess in one case would be moderation in another. Be this as it may, we often see no excesses until after the development of the disease, when they are really a symptom. The specific trouble contracted, rather than the excesses, is the cause. The percentages of cases due to syphilis given by different authors are as follows: Graf forty, Mendel seventy-five, Krafft-Ebing sixteen or seventeen, Regis from seventy to ninety, Hougberg over seventy-five, Bannister eighty-nine, etc.

The majority of alienists believe paresis to be different from tabes, though it may develop in the tabetic individual. In France

and Germany a different opinion is held by some,—that an identical process is at the foundation of both, that syphilitic infection, according to its location, causes the one or the other or both combined. No proof of either theory is furnished by our present knowledge of pathology. But it is certain that the two are etiologically related to syphilis. All the early symptoms of tabes may be precursors of a paresis later on, especially if accompanied by change of character, lowered intelligence, disordered speech, convulsions, etc.

Fürstner found in sixty-two of one hundred cases disease of the lateral and posterior columns, usually with marked implication of the lateral columns; in twenty-four there was disease of the posterior columns only, and in fourteen disease of the lateral columns. Hence the spastic symptom in the lower limbs with increased tendon reflexes and dorsal clonus is frequent, and the ataxic paraparesis with absent patellar reflex still more so. The paretic gait, characterized first by increased then by absent reflexes, and circumscribed muscular atrophy of the upper extremities may be of either spinal or peripheral origin. Localized sensory derangements in the legs and violent pains are due to disease of the posterior columns of the cord. General anæsthesia or, more frequently, analgesia is of psychical origin, from loss of the faculty of attention. Inability to control the bladder and intestines, when not due to spinal lesions, is of the same origin.

One of the most important and frequent symptoms is derangement of the pupils.¹ They may be unequal in size, irregular in shape, and react sluggishly to stimulation. The pupil should always be examined to detect these conditions and also the possibility of previous iritis and the effects of atropine, opium, etc. The pupils are larger in children and women, and in anæmic, sensitive, and nervous individuals. Very small equal pupils may be an early symptom. A slight pupillary difference is not, however, always a sign of paresis. It may be a congenital asymmetry, one of the so-called signs of degeneration, yet it may be of theoretical interest. The

¹ Lippincott, of Pittsburg, says that pupillary symptoms are of little consequence, as he often finds inequality of the pupils in the healthy. Hoche, of Strassburg, asserts that they are found in more than half the cases of paresis, often many years before the psychical symptoms appear.

reflex pupillary immobility to light, with retained mobility in accommodation, is of significance. It may affect one or both eyes.

Another symptom not mentioned in the books, I believe, after the study of about fifty cases, to be of the utmost importance,—anæsthesia of the ulnar nerve at the elbow. In only three cases out of the fifty have I found this nerve unaffected, and in two of these it was analgesic, and in the third there was very slight pain sensation.

The patient is easily made to believe that he is a musical wonder, and will try to imitate all musical efforts proposed, no matter how ridiculous.

A differentiation between the early stages of paresis and neurasthenia presents diagnostic difficulties. A number of symptoms are very much in common. Both show a preference for active, intelligent persons. Excesses play a part in the etiology of both. Neurasthenia may be the only symptom for a long time, later to develop a true paretic condition. It is a very suspicious symptom when a neurasthenic suddenly becomes euphoric or develops grandiose delusions.

Difficulty is also experienced in differentiating paresis from certain manifestations of chronic alcoholism (alcoholic pseudoparesis). Alcoholics seldom present a real reflex pupillary immobility. As a rule, after an extended period of abstinence the pupils react better in alcoholics.

Certain nervous conditions following accidents may also simulate progressive paresis, as they often present symptoms identical with those of certain types of paresis. However, if there is neither inequality nor reflex immobility of the pupils, nor progressive impairment of the intellectual faculties, the diagnosis "progressive paresis" is a very doubtful one.

To distinguish beginning paresis from diffuse syphilitic processes of the cortex is very difficult or even impossible. Having before us a disease whose diagnosis must give an absolutely unfavorable prognosis, the necessity of an early diagnosis is evident. Great mischief might be caused by men in high authority suffering from unrecognized general paresis. Only recently one of the legal fraternity stated to me that an offender against the law was sentenced to six years in the penitentiary by a paretic judge, when the prosecution would not have asked and could not have expected a

maximum penalty of more than six months in the workhouse. Not only might mischief be prevented, but loss of property and ruined reputation might be guarded against. Again, an early diagnosis will often enable us to secure absolute rest at once, the most important element in treatment, and possibly a remission with sufficient improvement to arrange all business affairs. As a rule, this rest cannot be had at home except under the most favorable circumstances.

As time passes these patients gradually grow worse. They may become very negligent as to their toilet and offer to take liberties with the ladies of their acquaintance or with the servants of the house. Some become angry on the slightest pretext and overlook gross infractions. Others become very egotistic and speak of themselves or their affairs incessantly. A lawyer under my care gave me numerous invitations to the club and handed me checks for fifty thousand dollars, one hundred thousand dollars, a million, and one check for a billion dollars.

Symptoms vary on different days, indeed on the same day. I have seen a patient rise in the morning very bright, but become towards evening dull, irritable, and flushed; or, *vice versa*, a patient may be bright in the evening and dull in the morning; in fact, I have seen a patient lapse from a comparatively normal condition to one of stupidity after a nap of an hour or two during the day.

Mickel describes a form of silent excitement which may take the place of mania, manifested by continually moving the limbs, pulling at the bedclothing, pushing at new objects, and resisting the necessary attentions of the nurse. The depressive form progresses more slowly than that in which the expansive delirium and the delusions are more marked. Megalomania of the French may be mistaken for paresis.

The sensibility of the skin is very much lessened in the advanced stages, particularly in the legs below the knees and in the feet. The cutaneous functions may be interfered with. There may be a dryness of the skin or increased, even excessive, diaphoresis at times, which may be confined to one side or otherwise localized.

There is also marked impairment of vision, from degeneration and atrophy of the optic nerve. Amblyopia, amaurosis, or loss of color-sense may occur in the early stages.

Hæmatoma auris is peculiar to the advanced stages of this dis-

ease. This is more frequent in males than in females and attacks the left ear by preference. Remissions occur, which may last for some time and lead the attending physician to give a favorable prognosis. In such cases a dismissal from the hospital is of questionable expediency unless the patient be placed under the care of a faithful attendant, as he is unfit to withstand even the ordinary cares of life.

Treatment in the first place should be preventive. The ambition to reach the pinnacle of success and prominence in business and social life, especially when coupled with the different forms of vice, dissipation, and intemperance, often accompanied by venereal disease, causes such a tax and overstrain of the mental faculties that this may account for the disease. Or, as Krafft-Ebing more tritely puts the cause, "syphilization and civilization," with "syphilization," no doubt, in the ascendancy. Or, as Hughes says, "The pace that kills is the pace that precipitates paresis." And this is especially true with those of great mental ability if unfortunate enough to contract specific disease. Those of the neuropathic type are prone to the other forms of nerve and brain trouble.

Very often these busy men think they know as much of the wants of the brain and nervous system as they do of business affairs. Hence they take their tours, their outings, their recreations, very often, however, with but little benefit, because of the lack of advice from their physician. Consultation with the family physician in conjunction with a neurologist is as necessary to the health of these men of affairs as consultation with an attorney is to the success of their business. Many times professional advice, if followed, would save the mind as well as the life. The recommendations of the family physician alone are not sufficient: he should also have the advice of a specialist.

Therapeutically, the patient should be given the benefit of the doubt in the way of specific treatment. Potassium iodide in doses increased to the limit of toleration is best in the majority of cases. As much as two hundred and fifty grains three times daily in some cases has done wonderfully well in the writer's experience.

Sometimes the mixed treatment is the one to adopt. Mercurial inunction may be necessary. The bromides, preferably sodium bromide, or in some cases bromide of lithium, actively given, with nerve tonics and a supporting diet, are very useful. Abstinence

from all alcoholics or stimulants of any kind is enjoined. Rest, especially mental rest, is absolutely necessary. The patient should get away from all business, even the ordinary cares of home. He should go to some quiet, healthful place. Even travel is to be advised against. Long, quiet sleep, oft repeated, is a valuable adjuvant to treatment. Bathing under the direction of a competent person, to increase the physiological metabolism, is essential. Turkish baths are beneficial in some cases, especially in those of alcoholic origin.

Persistent and methodical effort along this line will achieve satisfactory results in many cases and an occasional cure in others.

Surgery

OPERATIONS IN PRIVATE HOUSES.

A SPECIALLY PREPARED PRACTICAL PAPER.

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THE late Lewis Carroll, in his really wonderful book "Through the Looking-Glass," makes Humpty Dumpty explain to Alice the meaning of what he calls a "portmanteau" word. It is, he says, "like a portmanteau; there are two meanings packed up into one word."

In the literature of surgery we are constantly coming across what similarly I may call "portmanteau" sentences, only these contain not merely two, but many meanings. Take, for instance, the constantly recurring "My personal experience of such and such an operation is limited to fifty cases, with a mortality of four per cent." What a great deal is involved in such a phrase! To the surgeon it means at least half a dozen things; to the patient another half dozen, three or four of which are quite different; to the nurse, whose watchful care has contributed no little to the possibility of such a result, half a dozen others, some in common with the surgeon, some with the patient, some quite distinct and peculiar to herself.

Spoken of in this airy fashion an operation seems a small thing. In reality it is a matter which comprises many serious questions.

First, the surgeon must consider, is an operation required at all? next, is this the best operation for this particular patient? The mortality is four per cent. That sounds small, but to four patients it means death. Will this particular case survive? The knowledge of the general mortality percentage is useful, but in reality it tells us but little as to the prognosis in this particular case. Under

what circumstances will this patient have the best possible chances of recovery, and not only of recovery from the actual operation, but of a return to absolute health? There are many more such questions, all of which require an absolute and decisive answer before the surgeon can feel justified in proceeding; but suppose we stop there and follow out the many ramifications of this question.

Where and under what conditions shall the operation be done? There used to be, and I believe there is still, a great tendency on the part of young surgeons to ignore the importance of this point. A young, enthusiastic surgeon is so delighted to find that he is at last to reach the summit of his ambition, that he is to have the chance of showing his skill, that, sooner than lose that chance, he is ready to operate anywhere and under any conditions; and one occasionally hears men who should know better detail to an admiring crowd the story of how they "operated, sir, in a back kitchen, in a cottage, by the light of a tallow candle, and the patient did splendidly;" one seldom hears of the patients who died forthwith, or in a few miserable weeks, in consequence of the unfavorable conditions in which they were rashly exposed to such great dangers. The surgeon plumes himself upon his daring, his confidence in himself, his readiness to undertake anything that comes in his way. I heard of one who kept repeating, as he worked, "We're not frightened, we're not frightened." Surely, it is the patient who needs to be frightened at the peril of falling into the hands of such reckless men, and it is the patient who should be congratulated, not the surgeon, if he escapes alive. It is easy to be daring at another's expense. But it will be asked, what are you to do with a case of strangulated hernia, or a case of tracheotomy—must not they be operated on at once, and under any circumstances? To this I reply boldly, No! I have never seen a case of strangulated hernia—and I have seen many, and operated upon not a few—that could not wait until the best procurable conditions could be secured for it, that could not be moved a short distance into better surroundings. As to tracheotomy, there is always a period of warning. During that period other arrangements are possible, and the surgeon has only himself to blame if he does not make such arrangements during that period. This reckless haste is a relic, like many others, of the days when asepsis, and the absolute duty we owe to our patients of securing it, were unknown, and should be relegated finally to the past.

Whenever possible, I believe that a patient runs least risk and has the best prospect of entire recovery in a well-appointed hospital or in a well-conducted surgical home, a proper private hospital. There are, however, hospitals and hospitals, there are surgical homes and surgical homes. Many are not worth the name; some are as near perfection as they well can be. A surgeon should carefully consider how near any particular one comes to his ideal before he trusts his patients in it. Much depends upon the matron and the nurses connected with it. The feeding alone, the style of cooking, may weight the wavering balance one way or the other with wonderful force. Above all, I think we should feel positive that the leading spirit in the home, which is usually its matron, has what I might call "an aseptic conscience." She must be interpenetrated with the importance of asepsis above all things. She must have an eye for the minutest details in connection with it, for upon attention to detail success depends. Given this, the cases will do well; without it, the most costly appliances and the most perfect appointments are worthless,—the place is nothing but a whited sepulchre.

But supposing that the home is well managed and that asepsis is the ruling spirit in it, I believe there are many and great advantages for the patient, and I assume, as the main axiom of our work, that the patient's interests are the sole thing we have to consider. In the first place, the patient is removed from disturbing influences. Those now around her have only one object in view,—to promote her speedy recovery. They are intelligently trained to bring about that end; they are neither callous nor hysterically sympathetic. They do not fuss about her, nor do they overwhelm her with useless attentions at one moment and neglect the simplest precautions or the most evidently needed cares the next. The home is fitted for its work. Everything which may be required is on the premises. Necessary interference has not to be delayed whilst something is being obtained, at times from a considerable distance. If the nurses are, as they should be, properly trained, there is no difficulty in obtaining any desired information as to the progress of the case during the surgeon's absence. Excretions are not thrown away, but preserved for the surgeon's inspection. In my own home the nurses are able to make certain investigations, and so save time. Temperatures are taken and charts are kept, notes are ready for

perusal, so that at one's visit one can see at a glance what has happened and what progress has been made since the last inspection. The amount of urine passed in a given time is noted, its specific gravity is taken, and its reaction and the results of some of the simpler tests are on record. In a well-regulated home work is five times as easy as it is in a private house, for these reasons alone.

Then the beds are of the proper size. There is no difficulty in reaching or examining any part of the patient. The beds are movable and can be easily placed in any position in which the light will be most effective. The light itself can be easily shaded or increased as may be necessary.

In a properly built surgical home there is a proper theatre for operative work, with all the necessary appliances at hand. There is a proper table, of the right height, and adapted for placing the patient in the Trendelenburg or any other position that may be required. There is a plentiful supply of hot and cold boiled water. There is an irrigator in the best possible place. There is a proper sterilizer for instruments, towels, etc.; in short, the place is intended for the work to be done in it.

But, of course, it happens often enough that, for various reasons, an operation *has* to be done in a private house; and before undertaking such a thing the surgeon, in the interests of his patient, must pay careful attention to certain points. What these are is the main subject of this essay. First of all, the room in which the work is to be done; secondly, the furniture in the room; thirdly, the temperature of the room; fourthly, the preparation of the patient; fifthly, the position of the patient at the time; and, sixthly, the instruments and appliances required.

In order to treat the subject in the most concrete way, we will suppose the operation which is to be done is a hysterectomy.

The *room* is very important. It should have a good light. It is better to operate in the morning, since by doing so a patient is not being kept waiting and becoming more and more nervous. It is not well to give much food just before administering an anæsthetic. After the evening meal few people eat much, and so the ordinary night fast is sufficient for securing a time when the stomach is free from food. If the work is done soon after the patient awakes in the morning, there is no time for her to work herself into a fit of hysteria. So we have usually merely to consider the ordinary

daylight. The position of the window should be such that the best light available shall be thrown directly upon the operative field. It is best to choose a room in the first story above the ground floor, where the light is not so much obstructed by surrounding houses, trees, etc., and there is usually much less chance of being overlooked. It is better than the higher floors because it is not so far to carry up all that may be needed. A short blind should be arranged over the lower panes of glass, but all other blinds should be rolled up out of the way. Side-curtains of all kinds should be entirely removed. The light should come from the upper part of the window, and there should be nothing to obstruct it.

The Furniture.—The room should be large enough to hold all the furniture required and leave plenty of space for easy passage between. Usually one must begin by taking out a good deal. Carpets are better away, but, unfortunately, there is often difficulty in getting these removed. Overnight they should be swept with wet tea-leaves, the windows being open so as to get rid of as much dust as possible. The walls and any immovable furniture should be wiped down with a damp cloth. After this is done it is very satisfactory if the room can be filled overnight with the fumes from a formalin lamp; in this case, the windows should be opened early in the morning for half an hour. The space in front of the window on which the operating-table is to stand should be covered by oilcloth which has been sponged with hot water, or, if this is not available, by two or three layers of brown paper or newspapers. All toilet appurtenances must be carried out. Any rugs, mats, or hassocks are removed. All ornaments, pictures, and books must go. The narrowest bed in the house that is long enough should be placed in one corner, as far out of the way as possible; it will afterwards be moved to a more convenient position. In front of the window and about a foot and a half from it is placed the table on which the operation is to be done; if the Trendelenburg or lithotomy position is required, one end of the table should stand directly opposite the window.

The choice of a table is very important. Some surgeons provide their own, but generally, I think, it is better to arrange one from the materials at hand. Anything like a plank on trestles or any special patent erection is very objectionable. It has to be brought to the house, and is very suggestive of the erection of a

scaffold for the next day's execution! All the neighbors are excited and agog to watch the process of getting that ghastly board and its supports into the house and up the stairs. By managing without it the patient is saved one not inconsiderable annoyance. There are very few houses where a stout kitchen-table or two may not be had, and by placing these in the form of a T, with or without bricks under their feet to raise them to a proper height, a very useful and comfortable operating-table may be contrived. The top should be well scrubbed with soap-and-water. Sometimes one table is sufficient. In either case there should be no side-flaps; these are always in the way. If they cannot be removed,—and, as a rule, a screw-driver will make short work of them,—keep them down. If they are put up, they will drop at the worst moment, and nothing will make them safe. If neither of these positions is required, the table should lie rather aslant with reference to the window. The light is wanted to fall upon the abdomen, and if the table is parallel to the wall the surgeon's body or that of his assistant will intercept it.

If possible, place the patient's head furthest from the fire, for two reasons,—first, it is far better and pleasanter for her that her feet should be the warmest; and, second, because the anæsthetist has to stand at the head, and, should the operation be prolonged, you will expose him to a severe roasting if this arrangement is reversed.

The patient must be kept out of the room until the actual time for the operation. It is very trying for her to lie in bed and watch the process of preparation; it would take the last bit of courage out of any one. For the same reason, see that when she does come in everything like an instrument is covered up.

Two small, but steady, tables with perfectly flat tops are also required. Papier-maché tables are not to be trusted. One should be on the right-hand side of the operator, for instruments, ligatures, etc.; one somewhat to the left, and behind, for sponges. The ordinary washstand will do for the bowls required for sterilizing the hands, etc.

Five large washbasins and four smaller ones will be wanted. One of the large basins is required for washing, one for holding biniodide solution in which the hands may be washed from time to time during the operation, one to hold clean sponges, one for sterilizing, and one for holding the sterilized towels. Of the small basins one is for the biniodide spirit used in sterilizing the hands;

one for needles, which should be kept apart from the other instruments; one for any unforeseen need. I myself use ligatures and sutures preserved and kept in long glass tubes, from which they are not taken until they are required. Some surgeons, however, prefer to have them loose in an antiseptic solution, in which case one of the small basins may be utilized. All these utensils should have been carefully cleaned and scalded.

Two large flat pie-dishes are wanted, one for artery-clamps and one for the other instruments required.

An empty pail should be at hand for evacuated fluids, and another for dirty sponges, etc. I assume that gauze sponges are used and are thrown away as they become soiled.

There should be plenty of towels, of the plain—not rough—kind. These should have been previously boiled, and, one of them being used to envelop the rest, they should be dried in an oven. When dry, they remain wrapped up until required; the enveloping towel must not be used.

At least twelve gallons of hot and cold water which has been strained and sterilized by boiling for twenty minutes should be in readiness. It is best kept in large ewers which have been scalded out. I have seen this water poured into ewers containing the dust of ages. Clean towels should cover the open tops of these until they are needed.

Temperature.—For all operations in which the peritoneum is to be opened the temperature of the room should be at least 75° F. A gas stove is objectionable, as the vapors arising from it unite with the chloroform used, and produce a peculiarly acrid atmosphere, which is irritating to both patient and surgeon. As the doors and windows must be closed during the operation, this atmosphere soon becomes unbearable.

The patient's bodily heat must be conserved in every possible way. Long woollen stockings—cyclists' stockings are perhaps the best—should be drawn up over the legs and thighs. Hot blankets should be placed beneath and around any part which is not involved. These are covered by mackintosh and aseptic towels, for a considerable distance around the operative field. I prefer these to a mackintosh sheet with a central opening, as they can be displaced in any direction as required, or changed if they become soiled or wet. Besides, if a single mackintosh is to be of any use, it must be made

to adhere to the skin around the central aperture, otherwise water will percolate beneath and it becomes useless. Any material which will have this effect must either be left on the skin after the operation is over, in which case it will stick to dressings or clothes, or it must be washed off, and, as it usually requires some rubbing to remove it, the parts united will be early subjected to more strain than is advisable, since we wish to obtain primary union, and the more absolutely at rest all parts can remain after they are united the better the chance of such a result will be.

In many hospitals the table itself can be warmed. In a private house this is not possible. All the more care, therefore, should be taken that the blankets used should be as warm and thick as possible. Pillows previously warmed at the fire and placed below the blankets greatly help to preserve the bodily heat. All possible draughts must be excluded by felt or by pasting several layers of brown paper over cracks around the window-frames or wherever they may be needed. This is advisable not only for warmth, but also to prevent little eddies of dust from being blown into the abdominal cavity, on to instruments, sponges, etc.

The Preparation of the Patient.—Abdominal section is most often required for women. There is, of course, an ideal way of doing things, which may usually be carried out in a public hospital, but which is almost impossible in private practice. We have to steer a middle course, obtaining asepsis of the operative field whilst at the same time avoiding any annoyance to the susceptibilities of our patient.

Much will depend upon the nurses chosen. A good nurse is beyond price. A bad nurse—and I am not thinking of the “Gamp” varieties, but of a nurse who is slovenly, careless, or who has not the “aseptic conscience”—is one of the greatest difficulties a surgeon has to contend with. But it is only fair to say that nowadays these are the exceptions and not the rule. Nurses, I have found, are as careful as the surgeons they assist; they are often most enthusiastic over their cases, and such nurses are the greatest help one can have. It is as well, if the nurse has only just come from hospital training, to give her a hint as to the modifications necessary.

The bowels must be well cleared out. The best way is by a dose of castor oil overnight and an enema the next morning; but many patients have a purgative of their own, which they have

learned by experience to trust to, and it does no harm to use this if it is effective. Carlsbad salts, Eno's fruit salts, Hunyadi Janos water, Tamar Indien lozenges—any of them will do; moreover, some women cannot take castor oil without vomiting, and it is a bad plan to begin work by nauseating and disgusting the patient. Nothing, however, quite takes the place of the enema. Glycerin suppositories will empty the rectum, but do not satisfactorily clear it. Very few will object to the washing out if its necessity is once fairly explained to them. The enema must be warm, a little above the warmth of the body, and should consist of a pint or a pint and a half of soapy water. It should be given slowly, so as fairly to distend the gut; it is well to divide it into two parts, the first being given with a view to emptying the bowel of its fecal contents, and the second, ten minutes after the first has come away, with a view to washing the empty rectum. The second half may contain a drachm of izar and may be allowed to remain for from five to ten minutes.

The operative field must be prepared. In hospitals the parts are first shaved. Should the vagina need preparation, the vulva is shaved; in private practice this is impracticable, while the patient is awake, especially if she is young. In one instance of my own this was proposed to a girl of eighteen, by an energetic and very skilful nurse, with the result that the patient had an hysterical fit, no sleep all night, and was not at all in a suitable state for operation the next morning. Shaving is necessary, but it can very well be done during anæsthesia, before the operation is commenced.

But without shaving the skin and mucous membrane can be very thoroughly prepared. Almost every surgeon has his own method. The plan I prefer is given below. It should be carried out the previous night.

The skin of the abdomen is well washed and scrubbed with an antiseptic soap. This is to remove all gross impurities. It is scrubbed once more with a solution of hydrarg. biniodide in methylated spirit one to five hundred. This is to dissolve out fatty matters and to antisepticize both the outside of the skin and the sudoriparous and sebaceous glands. It is washed over by a solution one to one thousand of hydrarg. biniodide in boiled water. This is to remove the spirit and to prevent too rapid drying and consequent chapping of the skin. Perfectly new and distinct brushes are used for each purpose.

It is covered by three or four folds of lint soaked in an aqueous solution of hydrarg. biniodide, over which a layer of impervious material is placed, so as to convert this into an antiseptic poultice. The use of this is to soften and remove all old epithelium, and so to permit of freer access to the deeper parts when the process is repeated, as it should be, early the next morning.

After the second preparation in the morning, another pad of lint soaked in biniodide solution and covered by jaconet is fastened on the surface by a bandage. This is to preserve the skin in the aseptic condition to which it has been brought.

It is rarely necessary to interfere with the vagina of a young, unmarried woman. We have usually to do with the comparatively patent canals of women who have borne children. The nurse must see that this cleansing of the vagina is not a perfunctory performance. It is necessary to use an irrigator. The most convenient apparatus is that known as the rotunda douche. It can be used with any large ewer, and, once started, gives a steady flow. The force of the current will, of course, depend upon the height at which the ewer is placed. A chest of drawers, with or without a hassock placed upon it, is convenient for this purpose. The nozzle usually supplied has a blunt end which is perforated at the sides. I much prefer a straight tapering tube with a terminal orifice. With the former no fluid at all may find its way into the posterior fornix, since the vagina is not a rigid tube, and its folds act like valves in shutting out liquid from the parts above. The posterior fornix is most important in any operation which opens up the peritoneum from this canal. With the terminal jet the nurse can direct the stream in any direction required. She should be supplied with a Sims' speculum, so that she may open up the cavity thoroughly.

The patient is placed in Sims's position, across the bed with her hips well up towards the head of the bed and her head well down, so that the axis of her vagina shall be almost transverse to that of the bed. Most patients do not get their heads low enough. Flexion of the thighs and knees is not very important; all that is necessary is to keep them in bed and out of the way of the nurse's arms. With the patient in this position, the hips projecting well over the edge of the bed, and a mackintosh and towel beneath them to protect the bedclothes and direct the return stream into a pan below, the nurse can irrigate with comfort to herself and the patient.

Drawing back the perineum with the speculum, she should take a clean new tooth-brush, of medium stiffness, and with it apply some antiseptic soap and a little water to the whole vaginal surface, paying great attention to the fornices and to the os uteri, also to the folds of the vulva. I do not mention the folds of the vagina, as these should be straightened out by the speculum, which should be shifted from place to place as required. When the vagina has been thoroughly scrubbed and is filled with lather, this should be washed out by the irrigator filled with biniodide aqueous solution one to one thousand. The fluid should be allowed to flow with some force for five minutes, the nurse sending the stream in all directions, so that every part of the vagina is thoroughly drenched by it. A small piece of iodoform gauze is then left just inside the orifice, so as to filter any air which may enter. This disinfection should be done overnight and should be repeated the next morning.

Some surgeons use izal or creolin instead of the biniodide, and there is no doubt that it leaves the vagina in a more supple condition. These drugs, however, are not of the same antiseptic value and cannot be so absolutely relied upon, and the slight rigidity left by the mercurial salt is of no moment when anæsthesia is produced.

When the patient is anæsthetized, the parts are to be shaved and then scrubbed with a small gauze sponge saturated with turpentine. This should be immediately washed off with the biniodide spirit mentioned above, and, lastly, the parts are douched with aqueous biniodide solution. Turpentine is used because it is the most rapid and penetrating antiseptic we possess short of heat, but if it were left it would produce dermatitis; the spirit washes it off and leaves a deposit of mercuric iodide in the sebaceous glands. The watery solution prevents the too rapid drying of the skin.

In young and virgin girls, if the vagina has to be entered, sterilization is best done during anæsthesia. The parts are more relaxed and are more easily reached; the patient can be placed in the lithotomy position without affecting her sense of modesty, and in this position sterilization is much easier. The normal virginal vagina contains no pathogenic bacteria and does not require a very prolonged sterilizing process.

The Position of the Patient.—Olshausen says that intelligent criticism has everywhere welcomed the Trendelenburg position in pelvic surgery. My own experience does not ratify this. In many

—one might say most—hospitals its advantages are recognized and its use is fairly general; but in private houses the difficulty of carrying about a special table designed for this purpose has had the result that its necessity is often ignored, and operations which require it, if they are to be properly performed, are still done in the old dorsal position. It is well perhaps to emphasize once more the dangers to the patient of this practice.

Pelvic operations done from the abdominal side necessitate a preliminary cœliotomy as the first step. If the tumor to be removed is of any size, and solid, so that its bulk cannot be reduced by tapping, the opening required in the abdominal wall must be fairly large. In the dorsal position, directly the peritoneum is freely opened, unless they are retained by extensive adhesions, the small intestines immediately tend to escape. If they are allowed to do so, they are lowered in temperature and the surface becomes dry. The delicate endothelium of the serosa is altered in such a way that, when the abdomen is once more closed, the peritoneum will be found to have deteriorated greatly in its power of rapid absorption, that primarily important function which stands between the patient and acute peritonitis. If they are reduced, this will have to be continuously done, and the persistent and repeated manipulation has an equally bad effect. Moreover, all manipulation of the small intestine greatly increases shock, another of the main dangers of abdominal surgery. But, it may be objected, the intestine may be allowed to remain outside if covered by warm gauze which is continuously kept moist and warm by repeated douching with hot saline solution. Such constant douching means another assistant whose sole duty must be to attend to this. If it is left to one who has other work to do, it will be almost certainly neglected from time to time, and the viscera will be allowed to cool below a safe temperature. Besides this, threads from the gauze, fragments of tissue, bits of adhesions, etc., will be entangled among or become adherent to the exposed gut and be reduced into the cavity with them when the operation is over, and, once there, they will act as foreign bodies, nests for the development of bacteria, etc. The hot solution poured over them will, some of it, enter the cavity, and its removal will increase the manipulation of the deep parietal peritoneum necessary in sponging out, etc. Much of it will run down over the skin and collect below and around the body of the patient,

where it will rapidly become cold and so chill the skin, producing another main danger,—the risk of post-operative pneumonia, pleurisy, nephritis, or any other of the many evil possibilities which surround abdominal section, and which become probabilities when the vital energies are reduced by cold.

Now, all these risks are avoided by the Trendelenburg position, which insures the retention of the small intestine in the normal cavity and at its own normal temperature. In this position, if the intestines are free to move, as soon as air is admitted into the peritoneal cavity they fall away from the operative field into that part of the coeloma¹ which is still intact. If adhesions keep them fixed, these adhesions are most easily attacked and separated. The tension upon them produced by the action of gravity tends to widen the spaces where separation is to be done and to render such separation safer. As each portion is loosened it sinks away, exposing the next; its own weight drags upon the parts yet adherent, and gives the surgeon better opportunity for dealing with them. At no time are the operator's hands impeded by bulging, clinging coils of gut, as is the case in the ordinary dorsal position. In this way the operation itself is greatly shortened and valuable time is saved. Dangers of inadvertent injury to the gut from knife, scissors, or needle are now almost non-existent. The increased comfort to the surgeon is immense. This, of course, is but a secondary consideration, but it tells also in the patient's favor, since the operation itself is certain to be more neatly and perfectly performed.

But, it will be said, granting all this, the initial difficulty of carrying out this method in a private house remains the same. Unless we bring a special table to the house, and thereby cause a great commotion, which will terribly increase the natural alarm and nervous perturbation of the patient, which is just what we wish to avoid, such a position for her is almost an impossibility. On the contrary, it is in reality very easily obtained. A glance at Fig. 1 will show better than a verbal description how it may be done. The important points to be attended to are:

1. All the materials—table, chair, rope—must be strong and reliable.
2. The hind legs of the chair—a stout kitchen chair—must

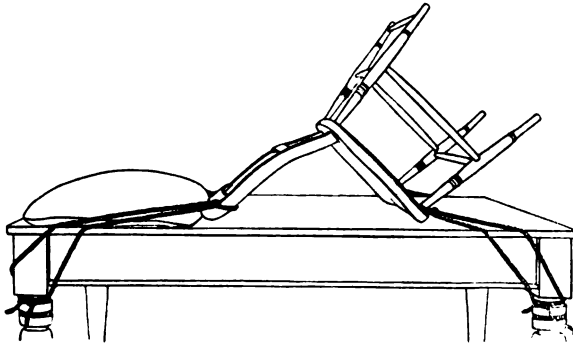
¹ The space between the viscera and the body-walls.

be united at or near their ends by a firm cross-bar. Any carpenter will do this in half an hour.

3. All the cords must be drawn as tight as possible and firmly knotted, so that the table and chair are one solidly united whole.

4. The patient, previously anæsthetized, is lifted on to this plat-

FIG. 1.



Extemporized operating-table for the Trendelenburg position.

form, previously covered by pillows, so that her knees correspond to the cross-bar. The feet and ankles are then fastened by slip-knots to the anterior legs of the chair just above the cross-bars placed between them.

Fig. 2 shows a patient in position on such an improvised Trendelenburg table, and the appearance of the room.

In this position the patient is raised above the ordinary level. The surgeon must, therefore, unless exceptionally tall, be raised also. One or two hassocks at the side of the table, to stand upon, will give him the desired height, but he must be certain that these are firm and that they will not give way.

If, however, the operation is to be done from the vagina, the lithotomy position is the best. Some surgeons use the Sims position, but any procedure which is practicable in the latter can, I believe, be better done in the former attitude. There is one point which is not always emphasized in text-books and which adds greatly to the ease with which work can be done in the lithotomy position, and that is the exaggeration of this position by raising the pelvis three or four inches from the level of the table. This is best done by placing Kelly's pad beneath. Kelly's pad is especially useful in operative work in private houses, because it serves not

only this purpose, but another. It provides a waterproof covering to the end of the table, and all fluids used in irrigation, etc., are carried by it safely into a receptacle beneath. It is only a detail, but so are all the things which make for success. Before use the pad must be well inflated, scrubbed thoroughly with aqueous biniodide solution, and warmed. It must not be of too large a size, or the pelvis will sink into it and the required elevation will be lost.

Clover's crutch is the best instrument to use for keeping the thighs up out of the way; but a good substitute may be improvised from two long roller towels, which should be secured by a clove-hitch, one around each knee; they are then brought up and united behind the neck and over one shoulder, in just the same way that the strap of the crutch is arranged. The union should be made by a handkerchief or some other thick and soft material. Many surgeons prefer a nurse on either side, to support the knees with one arm whilst the other remains free to assist; but in private work it is always well to economize in the number of one's assistants, and, even if that is not necessary, their two hands will be more useful than only one. Besides, there is always the possibility that they may use the hand which has been supporting, and which, therefore, is not sterile; indeed, I cannot see that it is possible for them to be sterile at all if engaged in this duty.

The *instruments and appliances* required will of necessity differ according to the operation which has to be performed. The main thing is that all should be in readiness, as frequently these operations have to be done at a distance from the surgeon's house, or from any place from which these requisites can be obtained. It is needless to insist upon the very great embarrassment which any neglect of this precaution may entail. To ensure completeness, it is well in packing one's bag to go over in detail the steps of the work to be done, placing on one side all the instruments, etc., required, as the need for them arises in the surgeon's mind. Kelly uses three bags,—one packed for simple operations, as curettage, one for plastic operations, split perineum, etc., and one for abdominal sections. He places just inside each bag a card on which are written all the materials contained; but I confess I prefer the former plan. Any modifications which appear desirable at the time are more readily allowed for and met.

Many surgeons sterilize their instruments before starting, and

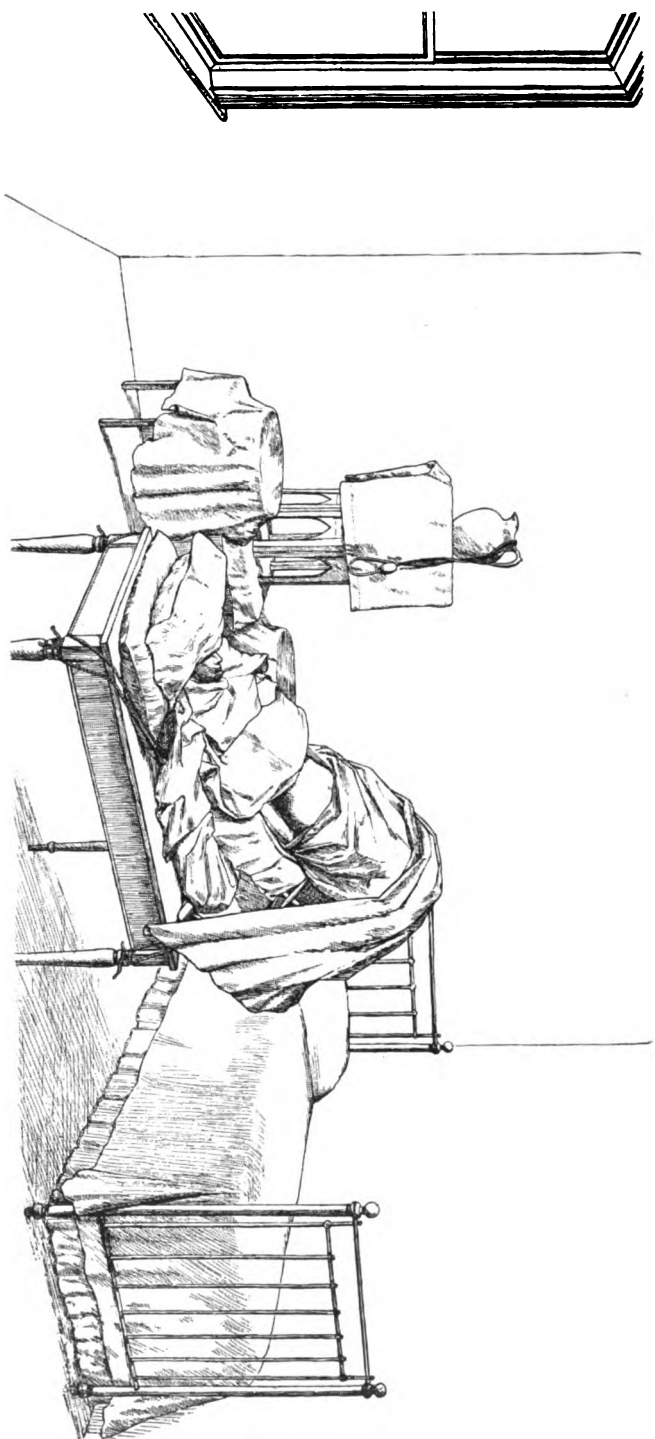


FIG. 2.—Patient in the Trendelenburg position on an improvised operating-table.

convey them in an aseptic case. This, of course, is a good method, but I think it is more satisfactory to sterilize immediately before the operation and in the house itself. This can easily be done whilst the final arrangements are being made, if a small portable sterilizer is carried also. Such small sterilizers are made by most instrument-makers. The instruments are placed in a wire tray and immersed in boiling water to which a small amount of ordinary soda is added. The lid is placed over and a double spirit lamp or gas jet is lighted beneath. In fifteen minutes the lid is removed, the wire tray lifted, and the instruments tilted out into the dish. In this way all danger of accidental soiling of instruments during their transport is avoided. The things pass directly from the sterilizer into sterilized salt solution in a sterilized dish, and remain there until used. They are afterwards cleansed, dried, and repacked.

Any one who has attempted conscientiously to carry out an aseptic operation in a private house knows that it entails far more difficulty and trouble than one performed in a properly appointed surgical home. Add to this the constant struggle with stupid or careless relatives and assistants, the frequent necessity for demonstrating over and over again the way in which the work should be done, the worry of finding one's directions misunderstood or bluntly ignored, the numberless possibilities for the entrance of sepsis, and it becomes doubtful whether we can ever properly secure for our patient in this way, what it should be our constant endeavor to obtain, the best possible conditions for success. Fortunately, in many cases the purer air around and the greater resistant and recuperative power of such patients counterbalance to some extent these drawbacks. If an operation must be so performed, too great care can hardly be taken in attention to the many little details upon which a successful result depends.

LOBULATED LIPOMA OF THE HAND; ANKYLOSIS OF BOTH HIPS.

BY THOMAS G. MORTON, M.D.,

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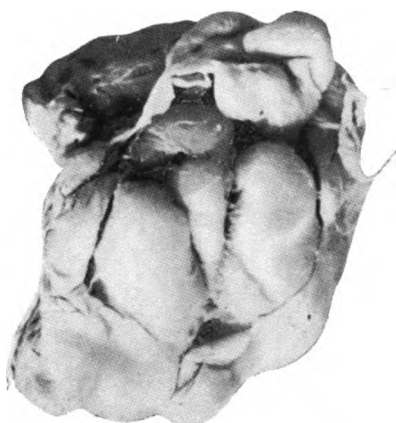
LIPOMA OF THE HAND.

THE following case of fatty tumor of the hand is the only instance of its kind which has come under my notice in a somewhat lengthy experience. Although the literature contains a number of cases of such tumors of the hand, to which I shall presently refer, it would, nevertheless, appear that these instances must be unusual, since many text-books and comprehensive works on surgery do not mention lipomas in the locality referred to.

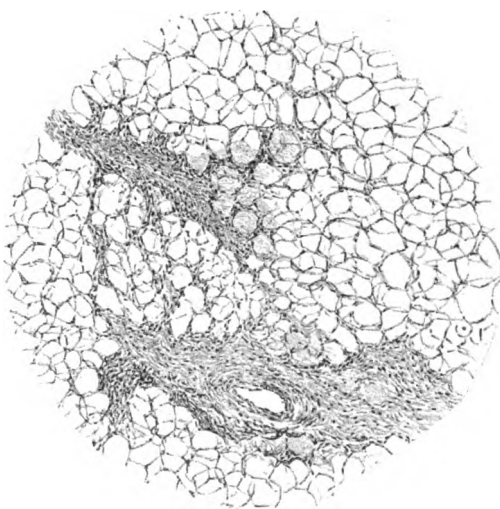
Mrs. K., aged forty-six, was admitted to the Orthopædic Hospital on June 14, 1899, for an operation for relief of a tumor which involved the dorsal and palmar regions of the left hand. Her general health had uniformly been good, and there was no history of injury. In May, 1898, more than a year previously, she had consulted me in regard to a small, elastic, insensitive, globular tumor on the dorsum of the hand over the extensor indicis tendon, which refused to rupture on sudden pressure. Mrs. K. was then directed to discontinue treatment unless the growth, which seemed to be cystic, should increase in size or cause pain. A year later, in June, 1899, I found that there had been a marked increase in the size of the tumor, and there was now pain, which extended up the arm as far as the shoulder. The original tumor, the one on the back of the hand, now measured an inch in length and three-quarters of an inch in breadth, while another growth, oval in form, had appeared in the palm, a large, soft, elastic mass, apparently involving the adductor pollicis muscle, very painful on pressure, and measuring two inches in its greatest diameter and an inch and a half across. Both tumors were readily compressed and apparently contained a more or less dense fluid; it was, however, noticed that pressure on either tumor did not increase or diminish the size of the other. A



FIG. 1.—Skiagraph of Dr. Morton's case of lipoma of the hand, showing increased space between the metacarpal bones of the index and middle fingers. The situation of the tumor is also dimly outlined.



**FIG. 2.—Dr. Morton's case of lipoma of the hand
(natural size).**



**FIG. 3.—Microscopical drawing of Dr. Morton's case of lipoma
of the hand.**

skiagraph (Fig. 1) shows an apparent widening of the space between the shafts of the second and third metacarpal bones.

An incision, made over the most prominent part of the dorsal tumor, on a line with the extensor tendon of the forefinger, discovered a mass of white fat, which was apparently an encapsulated lipoma, a portion of which was found to extend downward between the metacarpal bones towards the palm. After freeing this tumor, a second incision was made on the palm around the base of the volar eminence; this brought to view a large tumor of the same character, which had developed between and around the nerves and blood-vessels, and was intimately connected, or continuous, with the dorsal mass. With considerable difficulty the palmar mass was separated from the surrounding tissues, and, after the connecting band was divided, both portions of the tumor were removed. Recovery was uneventful.

Dr. Cattell reports the tumor to be an encapsulated lipoma, presenting over twenty lobulations. (Fig. 2.) The mass may be said to consist of two portions,—a smaller part, one and one-eighth inches by three-fourths of an inch, united by a band of connective tissue and fat, with a larger portion measuring two and three-eighths by one and seven-eighths inches. Microscopically (Fig. 3) the tumor is composed of fat; the trabeculæ of connective tissue are prominent and are permeated by well-formed blood-vessels. There are no signs of malignancy nor any form of degeneration within the fat cells.

S. D. Gross¹ considered fatty tumor of the hand an extremely rare affection, and stated that he had seen only one example of it. It was in a lady sixty-five years of age. "The tumor, about the size of an egg, was situated in the palm of the hand beneath the palmar aponeurosis, a process extending forward over the corresponding aspect of the ring finger. It had existed for twenty-two years."

J. Mason Warren,² in his "Surgical Observations," gave the particulars of two cases of adipose tumor, one of which was situated on the hand, and the other involved the first phalanx of one of the fingers, to which it clung so closely as to induce the belief, prior

¹ Gross, *System of Surgery*, vol. ii. p. 1029, 5th ed., Phila., 1872.

² Quoted by Gross, vol. ii. p. 1029.

to amputation, that it was malignant. It lay in immediate contact with the bone, and the pressure exerted upon it by the tendons and fascia had imparted to it this deceptive appearance. The patient was a child.

Professor Bigelow,¹ of Boston, reported a case of fatty tumor of one of the fingers, which so closely resembled a bursa that it was punctured.

Dr. Rognetta² reported having seen two cases of lipomatous tumor of the palm of the hand, in Dupuytren's clinic, but, as no operation was performed, the diagnosis was not positive. In a third case, in a man thirty years of age, the tumor was situated below the thumb, which was dislocated by the growth, between the first and second phalanges. On the front of the articulation an exostosis had formed. Dupuytren made a crucial incision over the prominence of the growth, which was as large as a small apple, and enucleated the tumor, without opening the articulation. The exostosis afterwards gradually disappeared and the thumb resumed its normal relations except that the joint remained ankylosed. The operation was followed by inflammation of the theca of the tendons of the forearm and hand and several abscesses had to be opened, but recovery followed, with preservation of the thumb.

Mr. C. B. Lockwood³ reported the case of a young lady, eighteen years of age. Tumor in palm of hand was first noticed at four years of age; it seems not improbable that it was congenital. It was situated under one of the muscles, sending prolongations through the palmar fascia.

M. Pitre⁴ reported the case of a woman, sixty years of age, who presented herself with a tumor of the right hand, on the thenar eminence. The tumor had existed for five years; had not attracted notice until ten months previously to application. It had the volume of a hazel-nut. After extirpation, it was found that it was a fibroma, which had developed in a muscle and which on its periphery had undergone fatty degeneration.

Virchow says that lipomata are always new growths. By lipoma is meant a tumor developed from adipose tissue, the fat being

¹ Also quoted by Gross, loc. cit.

² Gazette médicale de Paris, 1834, tome ii. p. 200.

³ Transactions of the Pathological Society of London, vol. xxxvii. p. 450.

⁴ Bull. de la Soc. anatomique de Paris, 1873, 5e série, tome viii. p. 521.

contained in cells provided with membrane and nuclei, agreeing in everything with the cells in the neighboring fatty tissue, but the cells, as a rule, are much larger. He notes the comparative infrequency of fatty tumors of the palm of the hand and sole of the foot. Something more than hypertrophy is required to form a lipoma: there is always a new growth. "As the rule, they are not simply hypertrophies, and it is not only the pre-existing fat cells which increase in size, but there is an actual new growth at the foundations of these tumors."¹

Thomas Annandale² observed that "fatty tumors are rare in the digits, and when they do occur they are usually of a diffuse kind and continuous with the subcutaneous tissue of the part."

K. Gurbiski³ reported a diffuse lipoma congenital in origin affecting the left hand.

Rigaud,⁴ at the Society of Medicine of Nancy, reported the case of a young boy who had a tumor of the palm of the right hand and the thenar eminence, presenting the appearance of a synovial cyst. It gave off small prolongations between the heads of the third and fourth metacarpal bones and also under the annular ligament of the carpus. It had a false fluctuation. Excision gave vent to a mass of fat easily enucleable. The seat of the tumor was apparently under the aponeurosis, as shown by the prolongation on the wrist.

J. M. Taylor,⁵ of Corinth, Mississippi, reported the case of a colored man, sixty years of age, who had a slight prominence in the palm of the hand in the region of the palmar arch. It had been causing intense pain for six or seven years and was exquisitely tender to the touch. Under chloroform, a semilunar incision, "with extremities pointing to metacarpal bone of thumb," was made and the palmar fascia divided; the tumor had a glistening surface and sprang up with the incision. It was enucleated with the handle of the scalpel. It extended up under the annular ligament.

Dr. Notta⁶ reported a case in a man, sixty-six years of age.

¹ Die krankhaften Geschwülste, Berlin, 1863.

² The Malformations, Diseases, and Injuries of the Fingers and Toes, and their Surgical Treatment, Phila., 1866, p. 158. Jacksonian Prize Essay.

³ Gaz. Cz. Warszawa, 1877, xxiii. p. 89. U. S. Surg.-Genl. Library.

⁴ Revue méd. de l'Est, 1875, tome iv. p. 242.

⁵ Miss. Valley Med. Monthly, 1881, 1, p. 214.

⁶ Bull. et Mém. de la Société de Paris, 1882, N. S., viii. p. 389.

An increase in size of the thenar eminence of the right hand had been observed for six years and was gradually augmenting. He had pains in his forearm from the elbow to the hand. On exposing the growth, it was found to extend under the flexor tendons of the fingers and even to the upper part and external aspect of the thenar eminence. It was removed by dissection and enucleation, and on examination was found to be composed entirely of fat. Extensive suppuration followed.

Trélat, in the discussion on the above case of Notta, mentioned a case, which had occurred twenty years before, in a man sixty years of age, and which three surgeons had pronounced to be a cyst, and this was his own opinion. He punctured it three times without getting any liquid, using a larger trocar each time. The last puncture brought to view a lobule of fat, and by traction the entire growth was removed. It had developed under the annular ligament.

Sutton, in his work on tumors, says, "Many specimens (of lipomata) have been observed in the palm of the hand, a situation in which they are apt to give rise to difficulty in diagnosis, more especially as they simulate compound ganglia of the flexor tendons. The lobes of fat are apt to burrow beneath the palmar fascia, and it is probable that some lipomata of the palm originate beneath this fascia, in the lobules of the fat lying between the lumbricales. . . . They are apt to be congenital."

Mr. Archibald Cuff¹ reports a case of lipoma of the hand. "The patient, a woman aged forty-four years, has had the tumor, which had slowly increased in size, for eight years. The tumor occupied the position of the thenar eminence, reaching above to the level of the base of the first metacarpal, and below projecting between the thumb and index finger. From the dorsum of the hand it was seen to project between the heads of the metacarpal bones of the thumb and index finger, pushing them apart. Irregular and lobulated in outline, the mass gave an indefinite sense of fluctuation on palpation. Its position not lying in the direct course of the tendon sheath, the way in which it was inserting itself between the metacarpal bones, and, lastly, the negative result on pushing an exploring needle into the mass distinguished it from

¹ London Lancet, May 21, 1898, p. 1395.

a cyst in connection with the tendons, with which the tumors are most likely to be confounded. It was removed by an incision made over its long axis, through which it shelled out easily."

Dominik Pupovac¹ gives an interesting description of a subaponeurotic lipoma of the palm of the hand. The patient was an eight-year-old boy with a good family history. He had had scarlet fever and measles. When six years old a small tumor was noticed on the back of the hand. A satisfactory explanation of its origin could not be given. The tumor was always painless and grew gradually to its present size. Shortly before consulting the surgeon there was noticed in the palm of the hand a tumor, which caused no further annoyance than that it hindered the complete bending of the fingers. The boy was well developed and showed nothing abnormal besides the tumor on the right hand, where on its dorsal surface it formed a mass the size of a hen's egg, which occupied the space between the third and fourth metacarpal bones, which were somewhat separated. The skin over the tumor appeared normal and was perfectly movable. The tumor took no part in flexion and extension, remaining stationary, and was not displaced into the underlying tissues. Consistency soft, elastic, and apparently fluctuating. On the palm of the hand there was a slight prominence occupying the space between the third and fourth bones. The skin covering this portion of the hand was normal, consistency soft, elastic, and apparently fluctuating. When pressure was made upon the portion of the tumor presenting on the palm of the hand, the dorsal tumor became more tense. The dorsal tumor was transparent. Owing to the soft, elastic consistency, the apparent fluctuation, and the seat, the probable diagnosis of hygroma was made.

As removal of the tumor was indicated, it was extirpated by Dr. Matzenauer on March 11, 1896. Narcosis was produced by Billroth's mixture, the hand being rendered ischæmic by an Es-march bandage. A longitudinal incision was made on the back of the hand in its longest diameter. The skin and deep fascia were separated, and there was seen an egg-shaped, yellow, slightly lobulated tumor, with a prolongation passing downward between the third and fourth metacarpal bones and thus connecting the mass above with the volar tumor below. The extensor tendons of

¹ Wiener klinische Wochenschrift, January 19, 1899.

the third and fourth fingers ran bow-shaped on either side of the tumor. Enucleation of the tumor was easily accomplished, the opening between the metacarpal bones having as its floor the soft tissues of the palm. Numerous small vessels were ligated and the skin was completely sewed. Healing took place by first intention.

The extirpated tumor was found to be composed of two unequal parts, the larger one being upon the dorsum and the smaller one constituting the volar tumor, the two being connected by an isthmus which passed through the interspace between the third and fourth metacarpal bones. "On section, the tumor had macroscopically the appearance of a lipoma, the diagnosis being subsequently confirmed by microscopical study. Pathologico-anatomical diagnosis would therefore be: lipoma lying beneath the fascia profunda dorsi manus, with a prolongation in the spatium interosseum between the third and fourth metacarpal bones, extending downward and uniting with a small mass of fatty tissue in the vola manus, which lay beneath the fascia palmaris."

When the point of origin of the lipoma is considered, Pupovac decides that the original seat was the subaponeurotic fat of the palm of the hand. The tumor developed from this situation, forced its way through the tendons of the flexor muscles of the fingers, passed through the interspace between the third and fourth metacarpal bones, and developed upon the dorsal surface of the hand to the size of a hen's egg.

In the literature upon this rare variety of tumor, we find an excellent article by J. Grosch.¹ He declares the occurrence of a lipoma upon the volar surface of the hand and fingers to be even more uncommon than the subaponeurotic lipoma of the head. The infrequency with which this variety of tumor occurs is also, according to this writer, the reason why a mistake in diagnosis for hygroma is so often made. The literature from 1867 to 1887 is carefully gone over, and of these cases (to the number of eight) nearly all were mistaken for hygroma. He accounts for this by the following facts: First, the extreme rarity of a lipoma in this situation. Second, the slow but steady growth of the tumor, which rarely produces any discomfort. Third, the method of growth of the tumor is such that the lobules extend in the form and shape

¹ Deutsche Zeitschrift für Chirurgie, vol. xxvi. Quoted by Pupovac, loc cit.

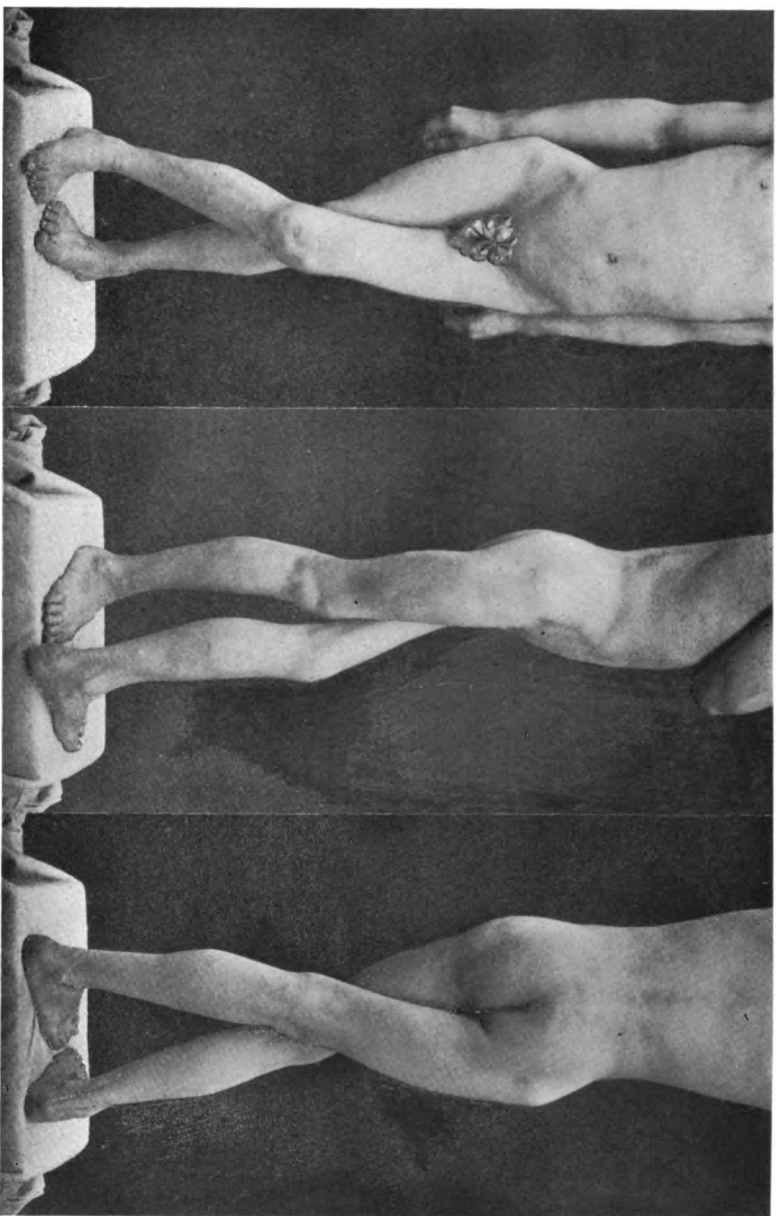


FIG. 4.—Anterior view.

FIG. 5.—Lateral view.

FIG. 6.—Posterior view.

DR. MORTON'S CASE OF ANKYLOSIS OF BOTH HIPs.

of a hygroma. Fourth, the soft, elastic, often fluctuating consistency of the tumor. Fifth, the phenomena of fremitus and, under certain conditions, of transparency. Grosch considers important for the differential diagnosis the following: First, on account of its anatomical relation, the subaponeurotic lipoma never extends beyond the hand into the forearm, being stopped by the transverse ligament of the volar carpus, while the hygroma may pass under this ligament. The tumor may grow into the fingers, owing to the situation of the nerves, vessels, and tendons. Second, the growth of the tumor through the interosseous spaces and its appearance upon the dorsal surface of the hand, whereby the metacarpal bones are widely separated the one from the other. The views held by Grosch agree with the observations made in Pupovac's case, and also with those of Steinheil upon lipoma of the hand and fingers which he reports in Volume VII. of Bruns's Beiträge. That the tumor does not extend beyond the transverse ligament is confirmed by observation, but the reason is not the anatomical one given above.

It will be observed that in the case which came under my care the growth of the tumor was *rapid*, with intense pain in the palm, increased on pressure, extending through the forearm and arm to the shoulder, thus differing from most of the cases reported. It has been suggested that a diagnosis could readily be made by using a freezing mixture: if the tumor were fatty, there would be a prompt consolidation of the mass; if a hygroma, no such effect would be produced.

ANKYLOSIS OF BOTH HIPs.

Edward A., aged twenty-one years, was admitted to the Pennsylvania Hospital, December 2, 1899, with complete ankylosis of both hips. Family history negative. He was well until four years of age, when he was dropped by his nurse and sustained some injury to the hips. Was treated by extension for several months, then rolled about in a wheeling chair for a year, and then allowed to go on crutches, the deformity gradually increasing until his seventh year; then the legs were crossed. On admission there was complete osseous ankylosis of both hips, the right limb being ankylosed and to the left, and the left limb ankylosed and being directly across the right. (Figs. 4, 5, and 6.) On December 5, subtrochanteric osteotomy was made. February 1, 1900, he walks with the aid of crutches. Legs straight, with the exception of genu valgus on the left side.

ON THE TREATMENT OF HYDATID CYSTS OF THE LIVER.

CLINICAL LECTURE DELIVERED AT THE HÔTEL-DIEU.

BY G. DIEULAFOY, M.D.,

Professor of Clinical Medicine at the Paris Faculty of Medicine.

GENTLEMEN,—On March 27 last, a man, twenty-five years of age, entered our wards, suffering from a large tumor on the right side in the hepatic region. He first noticed that something was wrong four months ago, during a march of forty-five days that he was obliged as a soldier to make in Algeria; he then felt a dull pain in that region, but it was not of sufficient account to make him go on the sick list. Soon afterwards he finished his period of military service and returned to France. The pain then decreased during several weeks, but after a while became acute again, being aggravated by any movement or effort in breathing. At this time he also noticed that his right side was swollen. Not long afterwards the symptoms became so severe that he had to give up his work as plasterer and enter the hospital.

His attitude in bed was peculiar, his knees being drawn up to his chin and his arms folding the lower part of his leg to his body. This was the only position in which he was relatively comfortable; as soon as he stretched out in bed, made any sudden movement, or took a deep breath the pain became intense. The pain, which he felt at the base of the chest, extended into the shoulder and was often accompanied by sensations of anguish and strangulation. Sleep was difficult, on account of the position which he was forced to assume, and when he walked he bent forward, trying instinctively to relax the pressure brought on the tumor by the abdominal muscles.

The tumor was a large one and threw forward the four lower ribs. The semicircumference of the chest on that side was two inches more than that on the other, and the skin showed a quantity of small veins due to collateral circulation caused by the impediment to the deeper vessels. The tumor could be plainly outlined

in the abdomen by the hand, and was hard and absolutely smooth. It had displaced the heart towards the left. Without dwelling on the differential diagnosis, I can say that the conditions were such that there was no doubt that it was a case of hydatid cyst of the liver, and I estimated that its contents would measure about three quarts. The patient's other organs were in good condition, his appetite was good, and I at once thought of a surgical intervention.

But was this operation to consist in emptying the pouch with a simple puncture, as in a case of pleurisy, or in a laparotomy with complete removal of the cyst? I decided in favor of the latter, because for the previous two days the patient had been feverish, and this, combined with the extreme pain, led me to believe that the cyst was infected and had begun to suppurate.

The operation was performed on April 4. The cyst was unicellular, and contained a liquid that was somewhat cloudy, showing that infection had begun. The fertile membrane was removed, the fibrous wall of the cyst sewn to the skin, and the cavity packed with sterilized gauze. The sequelæ of the operation were very simple, although the temperature went up to 100° for several days; but it must be remembered that the cyst was an infected one. Little by little the cavity walls retracted, and by May 8 the whole affair was healed up and the patient in a normal condition.

To contrast with this case of surgical treatment of hydatid cyst, let me give you the particulars of a case cured simply with my aspirating needle No. 2. In May, 1898, a boy of eleven was brought to me on account of an abdominal tumor that had begun to appear several months previously. I took him into my wards, and found a considerable enlargement in the region of the liver, where there was a smooth and regular tumor, whose outline, which could not be clearly defined, fused itself into the surface of the liver. This tumor was dull to percussion, was elastic though not fluctuating, and showed no fremitus. Its development had been gradual, without pain, vomiting, or fever, and the child's appetite was normal. Here again there could be no doubt about the diagnosis being hydatid cyst.

Since there was here neither pain nor fever, the case seemed to me one for aspiration, which was done at the most prominent point, and twenty-five ounces of clear, spring-water liquid were withdrawn. No pressure was applied to the abdomen, and the child was kept

motionless on his back for half a day. Nothing occurred after the puncture, neither distress, urticaria, nor fever; the tumor disappeared completely, the child got up on the third day, and in two weeks left the hospital entirely cured. I had news of him quite recently, and there has been no recurrence.

These two cases show you that a hydatid cyst can be cured by two entirely different methods; I propose now to discuss whether the two methods can be used indifferently, whether one of them is inferior to the other, and whether aspiration should be given up, as a rule, in favor of abdominal section.

It will not be necessary for me to recommend the latter process, which is thoroughly known; cases of hydatid cysts treated and cured in that way can be collected in great numbers. Still, if I can show that in some instances this disorder can be cured by mere aspiration, it may not be unimportant in some cases to choose this method, which is simplicity itself. As I have had a good deal of experience with the aspirating method, you will allow me to recall for you the cases which I have seen.

In 1870 a woman twenty-four years old came to my ward complaining that her right side was swollen, and on examining her I found a tumor in the hepatic region neither hard nor uneven. There appeared to be no general symptoms, fever, dyspepsia, or jaundice. She had first noticed it about eight months before, and complained of it now only on account of its steadily increasing size. I aspirated at the most prominent point of the tumor, finding, at a depth of about one and two-thirds inches, what looked like pure spring-water, of which I drew off about sixteen ounces, not stopping until the pouch seemed empty. This puncture, which was so insignificant that its mark was no longer visible the following morning, caused no disorder of any sort. The tumor disappeared for good, breathing became free again, and in two weeks the patient asked for her exeat.

In 1872 I saw in consultation a young soldier of twenty-two, who had noticed that for several months his right side over the liver was enlarging and that the region was somewhat painful. The diagnosis of hydatid cyst of the liver had been made, and I was asked to aspirate for it. I introduced my No. 2 needle at the most prominent part of the tumor and drew out a liquid that was characteristic of the disorder; the tumor immediately disappeared for good, and not long afterwards the patient left the hospital cured.

In 1882 a woman entered my wards for a tumor of the liver. My house-physician, wishing to verify his diagnosis before showing me the patient, made a puncture with a Pravaz syringe, drawing off a gramme of hydatid liquid, and immediately afterwards the woman was taken with a violent outbreak of urticaria. I made the usual aspiration with the No. 2 needle, drawing off three pints of liquid; the tumor disappeared and the patient recovered without incident.

In 1884 a man of forty-five was sent to me from Montevideo with the diagnosis of hydatid liver, and with this diagnosis I concurred after examining him. I proposed to him to treat it by aspiration; but the patient was anxious, and went to other countries to see various celebrities and get their opinion as to diagnosis and treatment. By the time that he returned to me his general condition was far less satisfactory: his appetite had decreased, the tumor had become painful, and several outbreaks of fever had occurred.

In presence of these new symptoms I feared that the cyst had become infected, and I told him that instead of simple aspiration he would now have to undergo a surgical operation. This he declined absolutely, saying that he would do so only if aspiration gave no result, and he insisted on my trying the latter without further delay. This I lost no time in doing in my usual manner, and withdrew about three pints of a cloudy liquid containing hooks and rich in leucocytes, so that my prevision as to infection was true. Although I had withdrawn all the liquid in the cyst, a tumor that still remained indicated the presence of a second cyst. I had, it is true, but little doubt that the infected cyst would rapidly fill up again and that an operation would be necessary. Contrary to my expectations, however, the patient's condition was much improved by the puncture, and two weeks later I treated the second cyst in the same way, feeling sure that it was not the first one, as I drew out two and a half pints of perfectly clear liquid. After this intervention the hepatic tumor disappeared altogether, and the liquid did not recur in either tumor. Two months later the patient returned to Montevideo, and I have seen him perfectly well in France during several succeeding years.

In 1894 and 1895 I treated two other men in my wards in the same way, one of them having jaundice at the same time; but both

recovered perfectly without the slightest complication. I also saw a young woman in 1895 with the same disorder. One of my surgeon colleagues in the hospitals wished to operate on her, but at my request tried the simple puncture first, and the patient recovered.

I have now, as you see, shown you quite a number of cases that prove that hydatid liver can be cured by simple aspiration, and not only that it can be cured but that it stays cured, as several of the foregoing patients were seen well months and years after treatment. These results are not to be overlooked, and yet there is some mistrust of this method, for which I will give the reasons and then discuss the question as to whether the distrust is justified or not.

It is claimed that puncture of a hydatid cyst may produce serious mishaps and even death. Here are four such instances.

In the first, that of a man of forty-two, a puncture was made with a capillary trocar, and the flow of the liquid was interrupted when about twelve ounces had been withdrawn. Five minutes later the patient was seized with syncope, from which, however, he at once recovered, and said that he was not suffering at all, but that the treatment had made a strong impression on him. Two hours later he had an intense rigor, with drawn face, hollow eyes, hic-cough, nausea, and then vomiting, but with no abdominal pain. The symptoms went from bad to worse: the pulse rose to 120 or 125 and became filiform, the extremities grew cold, and pain in the abdomen appeared. Patient died eighteen hours after the puncture. At the post-mortem a typical cyst was found of the size of an adult's head.

The second case was that of a man of thirty-one, whose cyst was aspirated. The liquid, colorless at first, became bloody almost at once, and stopped flowing in spite of movements imparted to the canula, which, on being withdrawn, was found to be blocked with fragments of membranes. The liquid contained the usual hooks. Two or three minutes later the patient was suddenly taken ill with intense dyspnœa and nausea. In a few seconds he ceased breathing, the pulse weakened and became imperceptible, the heart-beats could no longer be detected, and at the same time he vomited a large quantity of frothy, stringy mucus. The face was pallid and covered with cold sweat. Every known method of stimulation was at once applied, but in twenty minutes the patient was dead, without having uttered a word! The post-mortem revealed old pleural adhesions,

pericarditis, and mitral endocarditis, also two hydatid cysts of the liver.

The third case, due to Bryant, concerns a man of forty. A tiny trocar was inserted in the tumor and nine ounces of a clear, non-albuminous liquid were withdrawn,—enough to lessen the tension. A few seconds after this operation the patient became intensely red and complained of great pain in the face and maxillæ. As quickly as he had become red he then turned deathly pale, lost consciousness, and after vomiting two or three times had an epileptiform attack and his pulse stopped. Five minutes later he was dead.

At the post-mortem the peritoneal cavity contained half a pint of a reddish liquid. A hydatid cyst as large as an adult's head occupied the posterior part of the right lobe of the liver and contained three and a half pints of liquid. There was a little sclerosis of the liver, but no other visceral alteration.

The fourth case also concerned a man, and, in order to verify the diagnosis, the physician in charge made an aseptic exploratory puncture and withdrew about two teaspoonfuls of the usual liquid, after which the aspirating needle was also removed. A few minutes afterwards the patient was seized with malaise, sat up in bed, and began to scratch himself energetically. A minute or two afterwards a generalized epileptiform attack occurred, without initial cry or clonic movements. In a moment the patient came to himself for an instant and said, "I feel better; it's over;" but then another eclamptic crisis set in, longer than the first, and at the end of a few minutes the patient fell back on the bed exhausted, his face livid and covered with sweat, while the skin of the whole body turned purple. Pulse became weaker and weaker, and in less than ten minutes after the puncture it was no longer perceptible at the wrist; finally the scene ended with asphyxia in twenty-five minutes after the aspiration. Post-mortem: organs nearly normal; no liquid in peritoneal cavity. Enormous hepatic cyst, from which pressure drove out no liquid.

Such are the mishaps, terrible and fatal, that have followed aspiration for hydatid cysts, and such are the cases that have brought the method of aspiration into discredit. It seems to me, however, that these cases have been falsely interpreted, as I shall try to demonstrate to you.

It is evident that the passage of a small amount of hydatid

liquid into the peritoneal cavity may cause signs of intoxication, some harmless and others fatal. The simplest of these symptoms is urticaria; a cyst has been aspirated, and a short time afterwards the patient begins to scratch and patches of urticaria appear on the skin. This is also sometimes accompanied by agitation, dyspnoea, and vomiting, as occurs from time to time in cases of poisoning from eating mussels. These accidents are due to intoxication by absorption of hydatid liquid containing substances belonging to the class of ptomaines, and they range from simple urticaria to death in a very short space of time.

But, if you come to look at the cases closely, you see that these accidents are not due strictly to the puncture itself. The danger lies not in emptying a hydatid cyst by aspiration, but in making exploratory or partial punctures, in removing only a small amount of the liquid contained in the cyst. However small may be the opening made by the aspirating needle, you must remember that the liquid in the cyst is a liquid *under pressure*, and that it will easily escape through the puncture as soon as the needle is withdrawn. If care is taken to aspirate all the liquid which the cyst contains, the patient lying in the dorsal position, nothing is to be feared; but, if only a teaspoonful or two or at most a few ounces are withdrawn, the remaining liquid is driven by pressure through the aspirating orifice into the peritoneal cavity and signs of intoxication follow.

It should, therefore, be a rule never to make an exploratory puncture in a case of hepatic hydatid cyst; it should also be a rule not to empty the cyst *partially*, but completely. If during aspiration the needle becomes stopped up, it should not be withdrawn at once, but left in place while another puncture with another needle is made in the neighborhood. When the cyst is supposed to be empty, no pressure should be exerted on it to see if any more liquid will come; this may drive the needle out of the cyst and send some liquid into the peritoneal cavity.

With these precautions the aseptic puncture of a hydatid cyst of the liver with a No. 2 needle is, in my judgment, free from all danger and deserves to occupy a place among the different ways of treating this disorder. Consequently I propose the following conclusions:

1. Laparotomy with incision and removal of the cyst should

be reserved for old and very large cysts with adhesions, particularly if pain and fever point to infection of the cyst.

2. Aspiration with a No. 2 needle is applicable to about fifty per cent. of these cases, in the absence of the conditions mentioned in the preceding paragraph; cure can thus be effected in a few minutes.

3. When a cyst is aspirated, it must be emptied as far as possible. No exploratory or partial punctures should be made.

In this lecture I have intentionally passed over the treatment by injecting liquids (sublimite, iodine, naphthol) into the cyst, which I do not think free from objections. I have to-day only wished to speak to you about simple aspiration and the results it gives.

Obstetrics and Gynæcology

OBSTETRICAL PROPHYLAXIS IN GYNÆCOLOGY.¹

BY JAMES CLIFTON EDGAR, M.D.,

New York City.

A LARGE proportion of the patients who apply to the gynæcologist for relief of crippled pelvic organs owe their invalid condition to mismanagement or avoidable accidents of the pregnant, parturient, and lying-in states. This large class of invalids can be greatly reduced in number, if not practically done away with, by the practical teaching of clean and conservative obstetrics.

That a careful attention to prophylaxis on the part of the obstetrician is of value not only in anticipating and warding off many of the dangers of pregnancy, labor, and the puerperium, but also in preventing many subsequent disabilities of a gynæcological nature, admits of no question. Nowhere more than here does the old maxim that prevention is better than cure find truer application. The ground to be covered in any proper consideration of the subject is so large, and the time at our disposal so short, that we must content ourselves with briefly reviewing some of the salient points, especially those which have impressed themselves upon us as being of practical value.

The subject may be conveniently considered under three heads: (A) as it relates to pregnancy, (B) as it relates to labor, and (C) as it relates to the puerperium.

(A) *Pregnancy*.—There is relatively little that we can do during pregnancy which will have a direct influence in the prevention of subsequent uterine and pelvic trouble. Attention to the general health, however,—*e.g.*, the prevention of constipation, the proper treatment of coexisting anæmia, moderate exercise in the open air,

¹ Read before the Medical Society of the State of New York at its ninety-fourth annual meeting, held at Albany, January 30, 1900.

suitable clothing, especially the avoidance of constriction about the waist,—in a word, a good hygiene of pregnancy is undoubtedly of prophylactic importance especially in two ways: first, by providing the patient with healthy blood, one of the best germicides, and thus perhaps forestalling or minimizing the effects of septic infection; secondly, by increasing the muscular and general nutrition, factors of undoubted importance in the prevention of subsequent subinvolution of the uterus and adnexa.

Every pregnant woman should be impressed with the importance of placing herself under the care of the physician who is to attend her as soon as she shall become aware of her condition. It would be wise to give such a patient, early in gestation, some simple directions, either verbal or printed, embracing advice regarding exercise, clothing, diet, care of the bowels, skin, kidneys, breasts, teeth, and the danger signals of approaching complications.

There can be little doubt that not only patients, but their advisers, are too prone to consider this as a period of invalidism, and to forget that it is a physiological process. One of the important results of this belief is the neglect of muscular exercise, especially in the higher walks of life, where the desire to escape observation and the fears inspired by false views lead to the neglect of even the little exercise to which the patient is accustomed, and the consequent weakening of the whole muscular system. Now, just the opposite should be the case. The strain imposed upon the muscular system by the requirements of labor is a severe one, and should be forestalled by the cultivation, as far as possible, of muscular strength.

In the effort, however, to secure a proper hygiene of pregnancy, we should not forget the danger of over-exertion; and this brings us to the consideration of one point which we believe to be of especial and direct prophylactic importance. We refer to the avoidance of everything which increases intrapelvic pressure and resulting pelvic congestion.

An improper or insufficient diet during pregnancy can hardly be considered as a direct agency in the production of uterine disease. Acting, however, to produce a lowered vitality, it is doubtless an indirect factor in the causation of subinvolution and the evils which follow. There has as yet been little evidence advanced to show that in cases of normal pregnancy any special kind of diet is of importance, nor is it antecedently probable. A mixed diet, suffi-

cient in quantity to meet the often increased appetite of the patient, is probably the best.

Important modifications of diet are, of course, imperative in threatened albuminuria, vomiting of pregnancy, and other morbid conditions, but these need not be considered here.

The studies of Prochownik and others with reference to the prevention of dystocia by a restricted diet and those of Schenck with regard to the determination of sex by an analogous method are chiefly important from the stand-point of pure obstetrics.

(*B*) *Labor*.—While in the management of pregnancy we can, as a rule, act only indirectly as far as gynæcological prophylaxis is concerned, we can in the management of labor do a great deal which is of positive and immeasurable benefit to the patient in preventing subsequent serious and perhaps life-long disability. We may divide this branch of our subject into three parts, as follows: First, limiting the duration of labor; secondly, the prompt surgical treatment of traumatisms resulting from labor; and, thirdly, most important of all, the observance of strict asepsis.

1. That labor prolonged beyond the limits of safety is of itself the cause of subsequent local trouble is, of course, well known. This statement is applicable to all kinds of abnormal labor, but perhaps finds its best application in cases in which local sloughing of the maternal parts is caused by prolonged pressure of the foetal head. Vesico-vaginal fistula at once suggests itself in this connection.

And this brings us to the fact that maternal lesions may be the result not only of premature or unskilful use of the forceps, but also of undue delay in their use. To lay down exact rules as to the time which should be allowed to elapse before the application of the forceps, without reference to the individual case, would, of course, be wrong. Many circumstances must guide us here. But it is safe to say that, when with good uterine contractions the head remains stationary, the danger of injury to the maternal soft parts becomes an important factor. A similar danger also arises from too prolonged efforts to retard the passage of the head through the vaginal outlet in order to prevent laceration of the perineum. We refer here not only to the dangers arising from prolonged pressure, but also to permanent relaxation of the muscular structures of the pelvic floor with resulting disability.

2. It should be the aim of the obstetrician to leave his patient in at least as good condition as that in which he finds her, and no man should attempt the care of the lying-in patient who does not understand the ultimate results of the more common lesions of the genital tract which may accompany the parturient act and the methods of their repair.

Not long ago, when trachelorrhaphy was a very common operation, the immediate suture of cervical lacerations was advocated in many quarters. With the advent of more correct views, however, the majority of obstetricians do not favor the immediate repair of cervical lacerations except when required by severe hemorrhage. The danger of sepsis is by no means inconsiderable.

The importance of the immediate repair of all lacerations which endanger the muscular structures of the *pelvic floor* is now generally recognized. An external inspection of the parts is by no means sufficient, since a severe laceration involving the levator ani may exist without any external sign.

A word of caution is necessary, however, with regard to the details of the operation. Too often the operator simply restores the parts to their former appearance without uniting the torn muscular structures. Nor should the danger of sepsis be forgotten, especially when operating high up in the vagina. There is always a slight risk of infection, and many a case of puerperal sepsis has had its origin in a perineorrhaphy done without careful precautions of antisepsis.

Most important of all in connection with prophylaxis during labor is rigid attention to *asepsis* and antisepsis. The importance of septic infection as a factor in the production of uterine and pelvic disease is too evident to need comment. One fact, however, we desire to emphasize,—viz., that what is called antiseptic midwifery, while it has enormously decreased the mortality from puerperal infection, has by no means had a corresponding effect upon the morbidity. We are too prone to consider only mortality in our results, and to pass over entirely the question of morbidity. Even to-day the influences upon morbidity, the ultimate consequences of a mild puerperal process, are too apt to pass unrecognized by the obstetrician, and the case passes into the hands of the gynæcologist for the cure of chronic uterine and peri-uterine inflammation which had its origin in an unnecessary if not careless vaginal examina-

tion. We hear much of a lowered mortality, and little or nothing of a reduced morbidity.

(C) *The Puerperium*.—Here, while we cannot be so aggressive in our methods, since the period of action has passed, there is yet much that may be accomplished in the way of prophylaxis,—perhaps as much in the way of combating old and foolish customs as in the introduction of new ones of our own.

The all-important question at this time is, how can we best secure involution in the puerperal state? It is in the puerperium that we should rivet our attention upon the prevention of subinvolution, and especially in cases following the premature interruption of pregnancy. Were closer attention given to this subject in practice, the sequelæ of subinvolution—metritis, endometritis, retrodisplacements, and prolapsus—would be less frequently met.

In addition to the familiar means for the promotion of involution, a routine physical examination of every woman towards the close of the puerperium, and before she passes out of the observation of the obstetrician, is of the greatest value in the detection of slight departures from the normal process of involution and in drawing our attention to them when amenable to treatment. Were some simple, orderly method of history keeping of obstetric cases in private practice adhered to, this examination in the puerperium would readily become a routine, and give us valuable records for subsequent reference.

In the puerperium we find two principal factors predisposing to uterine displacement,—increased weight of the organ and relaxation of its supports. It is not strange, then, that displacements should at this period be brought about by causes which at other times would be quite insufficient.

Among these we may mention the improper use of the abdominal binder. We believe that the binder, when properly applied, conduces to the patient's comfort, especially by permitting her to assume the lateral position, diminishes the danger from syncope from decreased intra-abdominal pressure, and promotes involution of the abdominal muscles. We would, however, protest against its being applied too tightly, believing that such an application, especially when combined with a prolonged dorsal decubitus, tends to cause posterior displacements of the uterus.

The practice of keeping the patient upon the back for a long

period also favors posterior displacement, and we believe that after the first day the lateral position should be advised. This position also favors asepsis by promoting the discharge of lochia from the vagina. For several years we have taught our nurses and students to insist upon a "rotation of the patient" during the whole of the puerperium, meaning by this that the patient's position in bed during a given twenty-four hours shall be equally divided between the dorsal, abdominal, and right and left lateral postures. Many patients insist that they cannot sleep upon their abdomens or remain for any time in this posture. We have found, however, that with a little practice the habit can be readily acquired. We have counselled the practice of the abdominal posture in early pregnancy in anticipation of the lying-in state and its requirements.

We find many women who are unable completely to empty the bladder or bowel by the use of the bedpan, and resulting pelvic congestion and pressure are thus favored. The difficulty could have been avoided had the patient been trained in the use of the bedpan during pregnancy.

It has been recommended by some in selected cases, and by others in all, that patients be permitted to sit up upon the vessel placed in the bed or upon a commode at the side of the bed early in the puerperium, for bladder or bowel evacuation and to assist in uterine drainage. In our observation during the past ten years of many thousands of cases confined in the tenements, we have never seen dangerous symptoms result from this practice, although the majority within six or eight hours of their confinement sat up upon a vessel either in bed or at the bedside to pass urine.

The importance, to both mother and child, of the proper performance of the function of *lactation* is universally admitted. We would note, however, as bearing especially upon the subject in hand, the influence of nursing in favoring uterine contraction and involution, and thus aiding in the prevention of uterine disease.

Getting up too soon and especially too early resumption of household duties are, without doubt, important factors in the production of displacements and even prolapse, and particularly when delivery has been attended by some lesion of the pelvic floor which has been neglected or improperly or unskillfully treated. We would emphasize the fact that patients should, even after leaving the bed, spend a part of each day in the recumbent posture, and that the

occurrence of a backache should be regarded as a warning against standing or walking, and especially against any kind of work.

The importance of a routine examination of the pelvic contents and tonicity or sagging of the pelvic floor (levator ani muscle) at the completion of the puerperium cannot be over-estimated. If this be made a routine, many minor derangements could be at this time corrected which if allowed to remain untreated would by time become aggravated.

Some ten years ago my attention was drawn, especially in private practice, to cases of undue pelvic floor projection (sagging of the levator ani muscle) and to patients with weak abdominal muscles. At that time, at the suggestion of one of my first confinement patients, I began the use of the pelvic binder to sustain the pelvic floor and the lower portion of the anterior abdominal wall, in selected cases, for three months following the puerperium. The results obtained were so satisfactory that I soon used the pelvic binder in all cases.

The binder is made of muslin, linen, mull, Canton flannel, or two thicknesses of heavy gauze. It encircles the pelvis and lower abdomen at a level with the crests of the ilia. The pelvic floor is supported by means of a strap, made of the same material as the binder, which passes between the thighs, and, tightly drawn, is pinned either in front or behind as is most convenient. Ordinary corset lacing down the front or back secures a snug fitting of the binder. The pelvic binder, when applied, laced, and the perineal band secured, is not unlike in appearance and shape the ordinary swimming trunks worn by bathers.

I am accustomed to have half a dozen or a dozen pelvic binders made and fitted in the latter part of the puerperium, and to replace with them the ordinary abdominal binder as soon as the lochia have practically ceased in the third week of the puerperium, and when the patient first commences to sit up in bed or changes from the bed to the lounge, and to continue their use for three months from this time.

The results obtained by the use of this pelvic binder have been more than satisfactory. Its benefits have been readily appreciated by my patients themselves, some having used it after as many as three confinements.

1. It prevents or corrects undue sagging of the pelvic floor. This

is especially noticeable in cases where, during labor, the levator ani muscle has been subjected to severe or prolonged pressure, as in disproportion between the head and the outlet, in breech presentations, in forceps or craniotomy cases, or in labor prolonged near the termination of the second stage from any cause, in severe lacerations with bad union, and in cases where the levator ani is torn and the perineum remains intact.

2. It assists in the ultimate union of severe lacerations of the pelvic floor which have been repaired.

3. It preserves the woman's figure after confinement, by its support of the anterior abdominal wall and of the pelvic floor.

4. It lessens the dangers of displacements of the pelvic contents.

5. It tends to prevent pelvic congestion.

6. It usually adds to the comfort of the woman, giving her a feeling of security and well-being and allowing her to obtain needed exercise earlier and more freely than otherwise would be the case.

Unless pre-existing pelvic disease be present, with the use of this pelvic support we rarely see the danger signals of pelvic congestion, —namely, backache and symptoms of irritable bladder.

What place have drugs and various non-medicinal methods of treatment of the puerperium in the prevention of subinvolution and consequent gynæcological conditions?

During the past ten years we have experimented with various methods of treatment of the puerperium, with the object of determining, if possible, the best management for the prevention of subinvolution and subsequent gynæcological conditions. The subjoined "record blank" was adhered to in all cases, and as accurate

CASE No.	
Name	Age para Birthplace
Presentation	Position Month of gestation
Labor {	.....
<i>spontaneous or not,</i>	.....
<i>duration,</i>	.....
<i>complications,</i>	.....
<i>full-term or not,</i>	.....
<i>cervical, vaginal, and</i>	.....
<i>perineal lacerations.</i>	.....

PUERPERIUM.

1. Height of uterus above symphysis :

1st day 2d 3d 4th 5th 6th 7th 8th
 9th 10th 11th 12th 13th 14th 15th

2. Posture in bed { *dorsal,*
dorsal—elevated,
lateral,
abdominal,
was posture frequently changed? }
3. After-pains { *occurred on what days?*
duration,
intensity,
treatment, }
4. How were bladder and rectum emptied? { *catheter,*
bed-pan,
kneeling in bed,
commode or vessel
out of bed, }
5. What day first sat up in and left bed? { }
6. Was lactation normal?
7. Medication { *drugs,*
frequency, }
8. Douches { *vaginal—frequency,*
intra-uterine—frequency, }
9. Lochia { *less than usual,*
normal quantity,
profuse,
excessive,
ceased on what day? }

EXAMINATION ON DISCHARGE.

DAY OF PUERPERIUM.....

1. Quantity and character of lochia present { *bloody,*
rusty,
white,
none, }
2. Position, sensitiveness, and mobility of uterus? { }
3. Dilatation at internal os { *closed,*
admits index readily,
index passed with difficulty. }
4. Depth of uterine cavity from external os?
5. Did sound cause any bleeding?
6. Old and fresh cervical, vaginal, and perineal lacerations? { *location,*
extent,
character, }

Remarks.....

.....

.....

.....

Signed.....

Address.....

Date.....189

and as careful records as the circumstances permitted were kept, and in a large proportion of cases the examination upon a given date of the puerperium and the measurement of the depth of the uterine cavity were made by the writer.

Observations were made as follows:

I. No medication or special treatment during the puerperium,—primiparæ 22 cases, multiparæ 21 cases, total 43 cases.

II. Strychnine during the puerperium,—primiparæ 48 cases, multiparæ 55 cases, total 103 cases.

III. Strychnine during last two or three weeks of pregnancy and during puerperium,—multiparæ 30 cases.

IV. Ergot (two drachms of fluid extract) after completion of third stage,—primiparæ 18 cases, multiparæ 13 cases, total 31 cases.

V. Quinine (two grains thrice daily) during the puerperium,—primiparæ 22 cases, multiparæ 23 cases, total 45 cases.

VI. Posture in bed (1) mostly dorsal, and (2) posture equally divided between dorsal, right and left dorsal, and abdominal (rotation of the patient).

VII. Evacuation of the bladder and rectum by means of catheter and bedpan and early use of vessel or commode.

VIII. Vaginal douches (1) none at all, (2) one after the third stage, and (3) daily douches during the puerperium.

We are not prepared at this time to give the full results of our observations other than to call attention to the decidedly favorable influences of (1) strychnine administered both in the latter part of pregnancy and during the puerperium; (2) the marked advantages of the rotation of the patient as regards her posture during the lying-in period; and (3) the advantages of an early use of the vessel in bed or of the commode at the side of the bed, in favoring uterine drainage, in hastening involution, and in the avoidance of pelvic congestion.

ETHER IN CONFINEMENTS.

BY GEORGE K. FRENCH, M.D.,

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It is a medical as well as a popular belief that the bearing of children is a physiological process, and that the discomforts, the reflex symptoms, and the various painful conditions incident to pregnancy and labor should all be borne with as little assistance from the physician as possible. Shame on such indifference and neglect! We are educated to relieve, and not to neglect or be indifferent to unnecessary pain. This is the age of preventive medicine. I believe that a woman, from the commencement to the termination of pregnancy, should be under the care of a competent physician,—that is, one who does not look on the irritating symptoms of pregnancy and confinement as normal incidents, to which little or no attention need be paid.

When a woman has reason to think herself pregnant, she should consult her physician at once, and tell him everything relative to the history of previous pregnancy and confinement in her own or in her mother's family: this is very important, as dangerous or fatal complications at the time of confinement may thereby be avoided. In a recent case of mine where the pains were strong, the os after twenty-four hours was only as large as a dollar and remained so for hours. I learned afterwards that a stenotic condition of the os combined with excessive nervousness was a family idiosyncrasy. Even with forceps applied high up and under complete ether-narcosis, the os yielded very slowly, and made the case a severe instrumental one.

Morning sickness and reflex stomach symptoms can in most cases be relieved. The skin over the abdomen should be rubbed gently with olive oil night and morning. Varicosities indicate the use of elastic stockings. When the weight is a burden, Jaeger's seamless abdominal bandages will give support and warmth to the

parts. The urine should be tested for albumen four or five times during gestation, especially in primiparæ.

The diameters of the pelvis should be determined by the pelvimeter at the seventh or at the latest by the eighth month. At the same time an internal or external examination should be made to determine the position of the child, which, as a rule, does not change after that date, and if it does the mother will notice the change in her shape and call the doctor's attention to it. If any complications are found, the physician is prepared to deal with them when labor comes on, if he is not able to relieve them by appropriate treatment before that time.

If women would be advised by their medical attendant and faithfully follow his directions as regards food, medicines, and care, we would not see the untoward conditions so prevalent during pregnancy and the subsequent period of nursing. The health should be kept up by plenty of fresh air and sunshine, good nourishing foods, and the use of such drugs as may be indicated, so that the woman may be in the best possible condition for her confinement and for nursing her child. The nipples should be washed at least twice a day with equal parts of strong tea and brandy, to which a small amount of alum or tannin may be added.

When called to a confinement (and I request to be notified as soon as the pains commence), I have with me at least eight three-and-one-half-ounce cans of the best sulphuric ether for anæsthesia. I prefer the small size on account of the better condition of the ether, as it always deteriorates after it has been opened, no matter how well corked. I have two hypodermic syringes, one containing strychnine and the other ergot, also a saturated solution of quinia for stimulating contractions.

On my arrival I make the local examination, and, if the os is at all rigid, I give five grains of chloral hydrate, and repeat it as often as necessary, up to forty grains; if the os is very rigid, I give twenty grains of chloral hydrate per rectum, for its local as well as its constitutional effect. If there is much pain and the patient is drowsy or in need of sleep, I give one-eighth of a grain of morphine and one-hundredth of a grain of atropine per rectum. If I have no cone with me, I make one out of a towel and paper and safety-pins.

I instruct the patient to follow my directions implicitly, no

matter what happens, and, when she has a pain or contraction, to raise her hand or call me. As the head is about to be born, I give from one-half to one drachm of ether during the pains only; this, as a rule, greatly diminishes their severity.

I give the anæsthetic with a little air at first; this prevents nausea and the choking sensation which causes most patients to resist or struggle. As the pains increase I give more ether, but only just enough to prevent pain at the time of contraction, both during the distention of the os and of the perineum. When the head is about to emerge, I put the patient under complete narcosis and deliver, not with a pain but just after one is over. If pains come on during the delivery, I hold the head or presenting part back until the contraction is over, and then deliver, using one or two fingers in the rectum to press out the presenting part and thus prevent laceration.

After the head is born and rotation has taken place, I bring down the lower arm with my finger as high up as I can get it, then press the body in the direction of that arm and deliver the opposite arm; this prevents excessive distention of the perineum, which in many cases is torn by the shoulders and not by the head. Deliver the hand and arm without any jerking, as a precaution against the same accident. Usually the body slips out after the delivery of the arms and shoulders, but in some cases traction is necessary. All this is done under complete narcosis. These directions refer to vertex presentations, which constitute ninety-five per cent. of all cases. Other presentations are treated on the same general principles.

As soon as the child is born the ether cone is removed, and the patient becomes rational in from five to ten minutes. I have used ether in this way for the last ten years, and have seen no bad results therefrom to either mother or child. At subsequent confinements the patients insist that ether shall be given.

I consider ether much safer than chloroform; it is a tonic to the heart and promotes labor pains. It does not produce the sudden effects that chloroform does, and hence need not be watched so closely; the child is seldom affected by it and quickly recovers as normal respiration is established. Chloroform I give only when patients for various reasons cannot take ether. It is more easily administered, but one is more liable to give an overdose and the laity cannot be trusted with it.

The use of an anæsthetic in labor cases relieves the woman from the dread of confinement, saves her from the nervous and mental shock of the pains, and makes it a pleasure to give birth to a child; she comes out of her labor feeling strong and robust, her recovery is much more rapid, and the puerperium is attended by fewer complications. Patients are grateful for the relief given, and husbands are thankful to the physician for removing their wives' main objection to having a family.

As soon as the afterbirth is delivered I give the mother a drachm of ergot, and when there is a tendency to hemorrhage repeat it four times a day for two days, and then decrease by fifteen drops at each dose; in other cases I give decreased doses after the first one for from twenty-four to thirty-six hours. I have never yet been summoned on account of secondary hemorrhage in my own patients, but have been in other cases where ergot was not used.

The mother should be cleansed and made comfortable, with as little handling and fuss as possible. Never give an injection, either in the vagina or uterus, unless there are symptoms of septiciæmia or the discharges are offensive and the temperature is rising. I insist that fourteen days shall pass before the mother is up for the day. In twenty-one days she may assume charge of her household; but washing, scrubbing, sweeping, and machine-sewing should not be allowed until from four to six weeks after confinement.

If the mother's condition is good, I allow her to sit up to urinate and defecate after the first thirty-six or forty hours, and to nurse the child after the fourth or sixth day. Sitting up for meals is then allowed. If she is doing well, I allow the mother to get out of bed and sit up for an hour in a rocking-chair, and advise her to be moved to another room, that her bed may be aired and remade. If she becomes at all weary before the hour is up, she should return to bed immediately. On the eighth day she may sit up for two hours and may each day thereafter gradually increase the time, sitting up half the period allowed in the morning and the remainder in the afternoon or evening. It is a common fault for patients to overdo during the first month.

A liquid diet should be given for the first three or four days, to promote the secretion of milk; this is often neglected, and mothers lose their milk, and so add to the already long list of hand-fed infants. I consider it the fault of the physician that there

are not more babies nursed. If mothers were given a more generous diet, particularly of fluids, children would be nursed until the proper time to wean them,—between the tenth and thirteenth months.

It does not matter if there is no movement of the mother's bowels for three days, especially when there has been any laceration of the perineum. After that time I give small doses of magnesia and a mild laxative, and always avoid large doses of magnesia, opium, and belladonna.

When the delivery is complete, I use hæmostatic forceps, instead of tying the cord, cutting it about one and one-half inches from the umbilicus. I then tie it an inch from the navel. This I do to prevent secondary hemorrhage, which is liable to happen, especially if the cord is large and tough. I prefer camphorated oil or lint covered with oiled silk in dressing the cord; it may take longer to separate, but there is no sepsis. After tying the cord, smear vaseline over the baby, avoiding the eyes, mouth, nose, and navel; then wrap it in a woollen sheet and place it in a warm place. This removes the smegma and protects the skin. Always apply a two per cent. solution of nitrate of silver to the eyes and attend to them and to the navel yourself. Put the baby to the breast when dressed, to assist the contraction of the womb and to promote peristalsis in the child.

CANCER OF THE CERVIX; ETHER AND NEPHRITIS.

CLINICAL LECTURE DELIVERED AT THE BUFFALO GENERAL HOSPITAL.

BY MATTHEW D. MANN, A.M., M.D.,

Professor of Obstetrics and Gynæcology, Medical Department of the University of Buffalo; Gynæcologist to the Buffalo General Hospital.

GENTLEMEN,—The specimen I show you was removed from a woman thirty-nine years of age, married, with two children, whom I was called to another city to see some five years ago. At that time she had a large tumor on one side of the uterus. She was in great pain, suffering severely from shock, and in a bad way generally.

The diagnosis then made from the history of the case was extra-uterine pregnancy, with rupture of the tube. The woman was brought to Buffalo on a cot in the baggage-car, and, as soon as she could be got ready, I operated. The condition above described had existed long enough for many adhesions to form, and for decomposition of the clot, with consequent septicæmia. I cleaned out everything in the pelvis, broke up the adhesions, and, finding both tubes and ovaries diseased, removed them.

The patient got well and went home, and has been in fairly good health until recently. The removal of the tubes and ovaries caused cessation of menstruation; there had been no flow from the date of their removal until about two weeks ago. The woman being only thirty-nine years old, the menopause was not a normal, but an artificial, one, due to the removal of the ovaries. Two weeks ago the patient had a hemorrhage, and, being intelligent enough to know that it was not the return of her menstruation, but that it meant something was wrong, she immediately went to her physician, who made an examination and told her that he thought there was cancer of the cervix, and advised her to come to me at once and have the uterus removed.

She came, and I found an early stage of cancerous degeneration of the cervix. On examining the specimen, you will notice a great

degree of atrophy of the body of the uterus, which is not more than one-third of its normal size, a condition due to the removal of the ovaries; while the isthmus is very small and the cervix much enlarged, from the extension of the cancerous process.

The diagnosis of cancer was based upon the size of the cervix, the symptoms, and the fact that the tissues were so soft that they broke down readily under the finger. When I scratch the cervix in this way, my finger-nail penetrates into the tissue, and a piece is removed without any trouble. There is no normal cervical tissue left. Whenever you find tissue of the cervix so friable and soft that a piece can be scraped off and broken up with the finger-nail, you may be sure that it means malignant disease. Around the os a condition is present which we often hear about but very rarely see,—an ulceration of the cervix. Ulceration of the cervix has been supposed to be very common, but it is in reality very rare. It is found only in connection with cancer, chancroid disease, or chancre. The small erosions so frequently seen around the os are not really ulcerations at all.

Perhaps some of you will be surprised that this woman has given us no history of pain. While pain is generally present in the later stages of the disease, it is by no means an early symptom of cancer; if you wait until it is developed you will have waited too long. The disease is so insidious that there are often no symptoms at all,—no pain, no bleeding, only a little discharge. The patient thinks nothing of that, and does not go to the doctor. When, finally, the hemorrhages and pain do come, it is often too late to do anything in the way of radical operation. Large doses of morphine hypodermically under such circumstances alone afford any relief.

This woman came knowing that she had a cancer, and demanded surgical relief. I told her that I thought an operation would afford her a very fair chance of cure. The disease had not extended very far, there was no breaking-down, and the surrounding tissues were not involved.

The next question was, how should we operate? Should we remove the uterus through the vagina or through the abdominal wall? I have always been guided in my choice of operation in such cases by the conditions of the case itself, and there were certain points in the history of this case which decided me. In the first place, I thought that, as the patient had had extensive trouble in

the abdomen, it was altogether likely that there were adhesions between the uterus—perhaps at the point where the tubes had been removed—and the surrounding organs, especially the intestines. Now, intestinal adhesions can be very much better managed through the abdomen than through the vagina,—in fact, they form a very difficult complication when operating by the latter method. Suppose there were adhesions between the horn of the uterus and the intestine. If the abdomen be opened, with the patient in the Trendelenburg position, we might see the adhesions perfectly and be able to separate them with the knife, scissors, and fingers, without the risk of doing any damage to the intestine. If the intestine should be injured, we could bring it up and repair it with ease. In a recent case, in which I tore the intestine, I sewed up the rent with fine cat-gut and brought the peritoneum together with silk, and the patient has had no trouble at all, three or four weeks having already elapsed since the operation. Such a procedure would have been impossible had I operated *per vaginam*. Considering the possibility, then, of intestinal adhesions in this case, I deemed it best to open the abdomen, notwithstanding the fact that the woman was very fleshy and was not a favorable subject for the employment of the abdominal method. On the other hand, her vagina was large and roomy, and she would in that respect have offered favorable conditions for operation by the vaginal route.

The situation of the cancer was also a deciding factor in the choice. There are three points at which cancer invades the uterus: First, it may affect the vaginal portion and grow down into the vagina, forming an enormous tumor, completely filling the vagina, and being usually quite soft and friable. Secondly, there is a form which attacks the cervix, the part below the isthmus and above the external os, just as you see it here. Thirdly, the body of the uterus may be the seat of the disease.

There is quite a difference in the mode of growth of these three forms. The most serious of the three is undoubtedly that in which the cervix itself is involved. In this variety the disease extends to the broad ligaments much earlier than in the other forms, and the prognosis is less favorable. In cancer of the body the surrounding tissues are not much affected and the prognosis is better. Very rarely does a case like this one make a complete recovery: the disease soon returns. In cancer of the vaginal portion the prognosis

is also much better. Sometimes we find two forms together, when the disease extends both upward and downward, in which case the prognosis is very bad. So, you see, the original seat of the cancer is an important point in determining the prognosis.

As a rule, I operate through the vagina when the disease has invaded the body and the vaginal portion; but when the cervical portion is the seat of the disease, it is better, unless the case be seen very early, to operate through the abdomen. We can make a much cleaner sweep through the abdomen than through the vagina. We can remove the uterus more easily, and the surrounding affected tissues are more accessible.

On opening the abdomen I found to my surprise an entire absence of uterine adhesions. I think, in view of this fact, that it would perhaps have been better to operate through the vagina: I could have completed the operation much more quickly and with less shock to the patient. However, she has recovered from the immediate effects of the operation, and I think may pull through.

Now, another very interesting feature of the case remains to be mentioned. The patient came to the hospital in the afternoon and I operated next morning. It takes, as you know, quite a little time to get reports in a hospital, and, unfortunately, we did not get the analysis of the urine until after the operation. When it did come, we found there had been considerable trouble with her kidneys before the operation. There was a little pus in the urine; the specific gravity was 1026; albumen was present, and also hyaline and granular casts. If we had known all this before the operation, I think we might have proceeded a little differently, with benefit to the woman. When the kidneys are in this condition, ether does not act well as an anæsthetic. During the last few years I have lost five patients from uræmia, unquestionably caused by the use of ether. They did not die immediately after the operation, but in some instances not until two weeks afterwards. In a case of fibroid tumor, the woman had had two attacks of albuminuria. When she came to me the urine was normal and she failed to report her previous history. The result was that, immediately after the operation, she developed all the symptoms of renal irritation. The urine became very scanty, almost entirely suppressed, and she died, notwithstanding all our efforts to save her. This is the history of almost all these cases. In some of them there will be no history of any previous

kidney trouble whatever: they are to all appearances perfectly well, so I want you to be impressed with this fact.

In order to study the effect of ether upon the action of the kidney, we examined a short time since every case in my clinic, and some in the surgical wards, in which the patient had been kept under ether for some time, and we found that in fifty per cent. of these cases there were casts and albumen in the urine after the operation. This makes the administration of ether quite a serious matter if we run the risk of killing our patients by using it.

Is there any other anæsthetic that is not so likely to do harm? It is claimed that chloroform is safer, but we have seen casts and albumen after the use of that also. One German observer asserts that there is almost as much danger to the kidney from the use of chloroform as from ether. If that be so, it is difficult to say what is best. But remember that no person, especially one who is thirty-five or forty years of age or over, should be subjected to a lengthy operation without a previous examination of the urine, and the choice of anæsthetic should depend upon that. Of course the anæsthetic used in a short operation—like curetting, for instance—is not a matter of very great moment.

Now this woman has not done very well since the operation. Her temperature during the first day was less than 101° F.: then it went up to 103° and 104° F., but dropped to 101° again this morning. Her pulse has not been very rapid,—140. She is suffering to a certain extent from uræmic poisoning. The amount of urine is now about twenty-five ounces, so that the kidneys are doing a fair amount of work. Albumen is present, with bloody and granular casts and some free blood; the specific gravity is low. I think her condition is an especially dangerous one. Her life is threatened; but she may recover, with the use of hot-air baths, alkalies, plenty of water,—by the rectum, if necessary,—and digitalis. I think we may be able to pull her through, but we shall have to make a fight for it.

You will readily understand that the choice of an anæsthetic is a very serious matter. Mr. Tait used to say that, between the use of ether and chloroform, the only difference, if the patient died, was that one was a case for a coroner's inquest and the other was not.

This patient died of uræmia on the eleventh day after operation.

Pathology

THE GRANULES PRECIPITATED IN THE BLOOD BY CHLORIDE OF AMMONIUM (PROCESS OF MR. BARKER-SMITH), AND WHAT WE MAY LEARN FROM THEM.

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and Women.

THE process by which these granules are obtained is one originally proposed by Mr. Barker-Smith¹ for the microscopic detection of uric acid in the blood. In his paper Mr. Barker-Smith pointed out that chloride of ammonium, a well-known precipitant of uric acid in the urine, precipitates morphologically similar granules in the blood, which he suggested might also be uric acid.

His process was to draw a minute drop of blood from the end of the finger, to touch it with a microscope slide or cover-glass, to take up on a needle and mix with the blood minute quantities first of a ten-per-cent. solution of carbonate of sodium and then of a twenty-per-cent. solution of chloride of ammonium. After thorough mixing of the blood and solutions a cover-glass is put on, and after standing for thirty minutes the blood is examined under a one-sixth or one-eighth inch objective.

My experience has led me to modify this process in the following way. I take a very small drop of blood (it can hardly be too minute) on a microscope slide, mix it with an equal quantity or a slight excess (to dilute it somewhat) first of the sodium carbonate and then of the ammonium chloride solution, mix well, put on a cover-glass, place the slide in a box or under a glass with some moist cotton wool to prevent evaporation (this last precaution is taken

¹ Medical Times and Hospital Gazette, September, 1896.

to prevent precipitation of granules from the solutions themselves, which would complicate matters), and examine under the microscope after standing for thirty minutes.

I have further modified the process by adapting it to a quantitative method in the following way. At the end of the thirty minutes after mixing, place the slide under a one-eighth inch objective, select a field near the centre of the cover-glass (*i.e.*, as far removed as possible from the influence of evaporation), count all the granules and then all the red cells in the field, and divide the number of granules into the number of red cells; or, better, repeat this procedure in three or four fields, all as near the centre of the cover-glass as possible, write down each result as obtained, then add up all the granules and all the red cells and divide the sum of the former into the sum of the latter. The operation of counting is much facilitated by using a micrometer eye-piece, and, while all the granules should be counted in each field, it may suffice to count the red cells in a part of them and get the average by multiplication. All the results to be presently mentioned were obtained by this method.

Knowing that I could control the excretion of uric acid in the urine, and believing from other physiological and pathological experiences that in doing this I at the same time controlled the amount in the blood, it occurred to me, soon after Mr. Barker-Smith's suggestion was published, to put this theory to a practical test that would demonstrate its correctness, and this I proceeded to do.

I first applied it to my own blood and urine as watched by me from day to day and hour to hour under physiological conditions, and then in the same way studied the effects of various drugs, and, having got quite definite and constant results, I proceeded to the wider field of pathology, and here also found that the results corresponded in every way with our previous knowledge of the conditions in which uric acid is met with in the blood. These investigations and observations, repeated many times during several months of work, convinced me that these granules were no chance product of chemical or physical precipitation, varying by mere chance in all ways and in all directions from hour to hour and day to day; but that they bore, as I found to be the case, a definite and precise relation to the excretion of uric acid in the urine from hour to hour and day to day, under the influence both of drugs and of

disease, and that they could not possibly be anything other than uric acid itself, or some very closely related chemical substance capable of conversion into uric acid in the human body.

The mere fact of precipitation by chloride of ammonium would not help us to distinguish between uric acid and its near relative xanthin; but, as we shall presently see, there are some facts to be brought forward which, though not absolutely conclusive, make the probability very great that the substance is uric acid, and this tends to confirm the original conclusion of Sir A. Garrod¹ that normal blood in the human subject contains some uric acid and differs from pathological blood merely in the quantity which it contains.

Some of the results of my earlier investigations of this process were published in the fourth edition of my work on "Uric Acid" in December, 1897, and I gave a demonstration of the process itself, at which Mr. Barker-Smith was present, before the Royal Medical and Chirurgical Society on March 22, 1898. I now propose briefly to mention some results of further work and the conclusions which I would draw from them, and for this purpose I shall touch upon the relations of these granules to physiology, to drug action, and to pathology.

In physiology a few weeks' work sufficed to prove that my blood always contained more of the granules in the forenoon hours—say, from 5 A.M. to 1 or 2 P.M.—than in the afternoon hours—from 2 P.M. onward to 10 or 11 P.M. or midnight. Thus, in a period extending over several months I found in the morning an average relation of one granule to eight or ten or twelve red cells, and in the evening a relation of from one to eighteen to one to twenty-five.

Now, a glance at Fig. 3 in "Uric Acid" shows that this is in absolute accord with the hourly excretion of uric acid throughout the day, and, as I was at the same time examining the total amount of my urine every day, I saw that the daily fluctuations in the blood granules night and morning also corresponded with the fluctuations in the total excretion of the day, and that in many cases an examination of the blood at 10 A.M. (about the middle of the large morning excretion of uric acid) would enable me to forecast roughly the larger or smaller excretion of uric acid in the day's urine, and I have made use of this fact in Figs. 3 and 4.

¹ Gout and Rheumatic Gout, third edition, p. 85.

After watching these results for some time, I came to the conclusion that I should probably get definite and distinct results by examining both blood and urine from hour to hour, and Fig. 1 shows one of my results obtained in this way: here at 10.15 the

FIG. 1.

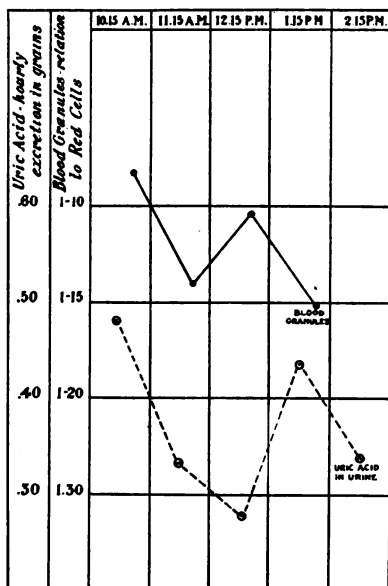
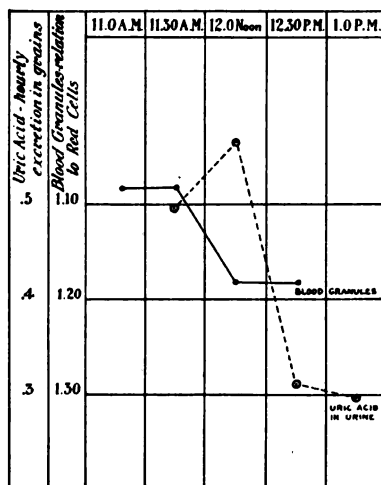


FIG. 2.



uric acid in the urine was .49 grain per hour, and the proportion of the granules in the blood examined after the urine had been passed (and therefore placed a little to the right of the uric acid curve) one to eight. At 11.15 the uric acid had fallen to .34 grain per hour and the blood granules had followed to one in seventeen. At 12.15 the uric acid had further fallen to .29 grain per hour, but the blood granules had risen to one to ten. At 1.15 P.M. the uric acid had risen to .44 grain per hour, but the blood granules had fallen slightly,—to one in fifteen. At 2.15 the urine was collected, but the blood could not be examined, and then the uric acid had fallen to .35 grain per hour.

The figure as a whole shows one character which is common to most of the curves obtained in this way,—namely, that the fluctuation in the blood granules generally precedes by from thirty to ninety minutes the fluctuation in the excretion of uric acid in the urine. Thus, the lowest point in blood granules is at 11.30, the

lowest point in uric acid excretion is at 12.15, the granules rise again about 12.30, the uric acid rises at 1.15 (*i.e.*, in the hour ending 1.15 P.M.), then the granules fall at about 1.30 and the uric acid at 2.15.

Fig. 2 shows a somewhat similar curve, in which the blood granules are more than one to ten at 11 and 11.30 A.M., but fall to one in nineteen at 12 and 12.30 P.M. The uric acid, however, has risen at 12, but falls at 12.30 and remains low at 1 P.M.

We see, then, not only that the blood and urine correspond roughly for the whole day and for morning and evening, but that their chief fluctuations correspond more or less accurately from hour to hour. What I wish to point out with regard to these figures is that large and well-marked fluctuations in the number of blood granules are, as a rule, faithfully reproduced in corresponding fluctuation in the excretion of uric acid in the urine, and that the fluctuation in the granules often appears to precede that in the urine. We must remember, however, that the uric acid in the urine is the summation, so to speak, of a whole hour, while the blood granules represent only the condition of the blood at one minute in the hour, so that nothing more than a general correspondence of large and well-marked fluctuations can be expected.

There is only one other fact in physiology that I need mention, —namely, that the blood of children generally contains more granules (say from one to six to one to twelve) than that of adults, just as their urine generally contains more uric acid and as they excrete more per hour for each pound of body weight than adults do.¹

When we come to drug action, we again meet with results that can hardly be spoken of as anything but extraordinary, so little did I expect to meet with them when I began this research.

As before mentioned, I had long known that I could do anything I pleased with the excretion of uric acid in the urine, and I soon found that this power extended also to the blood granules. But I could not separate the one from the other: everything that increased uric acid in the urine increased the blood granules, and *vice versa*.

The drugs that best show these results are the salicylates, as one would expect from the enormous fluctuation they produce in the

¹ See Uric Acid, fourth edition, p. 568.

excretion of uric acid in the urine,¹ but similar results can be produced with alkalies if we bear in mind the laws that govern their influence on the excretion of uric acid. One of the first things I did was to try the effects of salicylates on myself, and I found that on a day (Fig. 3) when I took fifty grains of sodium salicylate and excreted 19.5 grains of uric acid in the urine the blood granules at 10.30 A.M. were one to five. On the following day, no drugs being taken, the excretion of uric acid in the urine was only twelve grains and the blood granules at the same hour were one to thirty-six. On the following day, no drugs being taken, the uric acid had further fallen to 7.6 grains, and the blood granules at 10.30 A.M. were one to seventy-five. On another occasion (Fig. 4), with upward of twenty grains excreted in the urine as the result of taking salicylates, the granules were one to four; on the following day, with no drugs, the uric acid in the urine had fallen to 10.7 grains and the granules were one to thirty-four. On the following day the uric acid had risen to 13.4 grains and the granules were one to ten.

With regard to these two figures, we see that, when the uric acid is increased in the urine by taking a salicylate, the granules in the blood are greatly increased in relation to red cells. When the use of the drug is discontinued, the excretion of uric acid in the urine falls very low, as is generally the case under such circumstances, and the blood granules show also a very great diminution in relation to red cells; and in Fig. 4 we see that, when the excretion of uric acid in the urine again rises, the granules in the blood also increase.

As I said in reference to Figs. 1 and 2, there is no very constant ratio between the granules and the uric acid, as the granule curve sometimes moves more and at other times less than the uric acid curve; but, as the granule curve merely represents the condition of the blood at one particular moment in the twenty-four hours, any greater correspondence with the urinary excretion is not to be expected. But great changes in the one are always faithfully reflected in the other, and, as we shall see, comparatively rapid changes in the blood can be produced by these drugs.

At first I repeated these experiments a large number of times before I could bring myself to believe that these coincidences stood

¹ See Uric Acid, fourth edition, Fig. 8.

in the relation of cause and effect and were not accidental, and that I had really complete power over the blood granules as well as over the uric acid in the urine.

On another occasion the blood was examined at 9 P.M., no drug having been taken, and the granules were found to be one to twenty-

FIG. 3.

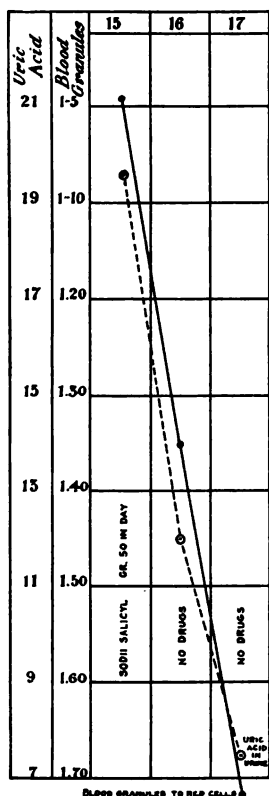
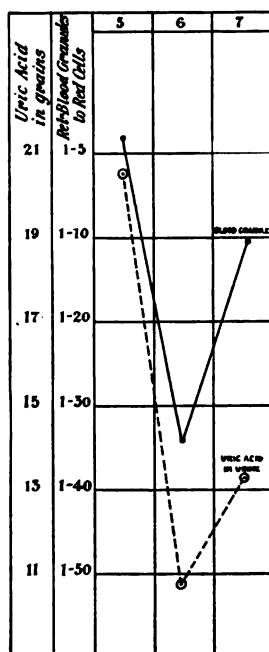


FIG. 4.



two. Twenty grains of sodium salicylate were swallowed just after drawing the blood, and at 10.15 P.M. the blood granules had altered to one in eight, and later, about 11 P.M., to one in six.

Then I found in patients the following results: In the blood of Thomas J., aged ten years, while taking salicylates for erythema, the granules were as numerous as the red cells, but on the first day after leaving off the salicylates they were found in the proportion of one to nine. In Rose O., seven years old, on the last day of using

salicylates for rheumatic fever the granules were in the ratio of one to six, while on the first day without drugs they were one in eleven. In Emily S., aged nineteen, salicylates were beginning to relieve the pain of acute rheumatism, her temperature was 102° F., and the proportion was one to two. In the case of Emily B., aged twenty-one, on the sixth day of an attack of subacute rheumatism, during which no drugs were taken, her temperature was 101° F., and granules were present in the ratio of one to eighteen. Two days later, the pains having been relieved by salicylates, her temperature was normal and the ratio was one to four. When no drugs had been taken for three days the proportion was one to twelve. In these cases the urine was not watched and the blood was simply taken in relation to the probable action of the drugs. Thomas J. illustrates the large quantity in children, though Emily S. runs him close. Again, in the case of William W., aged twelve, while on salicylates for acute rheumatism the ratio was one to three, and on the first day without drugs it was one to twelve.

A similar result, but in the opposite direction, can be produced with any drug which lessens the solubility of uric acid or with any metal, such as iron or mercury, which forms an insoluble compound with it. Thus, one day blood drawn at 6.20 P.M. gave granules to red cells one to ten. Just after the blood was drawn, as much pulv. ferri. carb. sacch. as could be piled on a sixpenny piece was swallowed. The blood at 7.20 gave granules to cells one to thirty-seven, and for some fifteen or twenty minutes before this there were very marked arthritic pains in the feet, ankles, and fingers, showing where the insoluble urate of iron had gone. At 9.30, two hours later, there were still arthritic pains, which had continued ever since the last note, but they were getting less, and the blood gave a relation of granules to cells of one to nine. The exacerbation caused by the iron had passed off and its effects were gradually subsiding. Exactly the same result can be obtained with mercury and other metals that diminish the excretion of uric acid in the urine.

Here also we can study the fluctuations of arthritis from two points of view: it was produced by a metal which cleared the blood of granules and diminished the excretion of uric acid in the urine: it was cured by a drug (salicylate) which increased the granules in the blood and the excretion of uric acid in the urine. And, as I have for some years been pointing out, salicylates will not cure

arthritis if the conditions present prevent their causing an increased excretion of uric acid in the urine; and under these conditions they will also, no doubt, fail to increase the granules in the blood, so that the whole history of arthritis can be watched and verified from point to point by thus examining the blood.

In the same way the curative action of such metals as iron, mercury, etc., in chlorosis and anæmia and their influence upon the blood may also be watched, and will be seen to be due to and to correspond with their effect in clearing the blood of granules and the urine of uric acid. And we are here again in a position to follow cause and effect from point to point in the blood itself, and, if need be, from hour to hour.

I will now pass on to pathology. Bearing in mind the well-known fact that uric acid is present in the blood in chronic gout and in Bright's disease and practically absent from it in acute fever, I began my investigations by comparing my own blood with that of sufferers from Bright's disease and chronic gout on the one hand, and with that of fever patients on the other. I need only mention the patients and their diseases here.

Thus, in Julia A., aged twenty-four, a sufferer from chronic Bright's disease with large pale kidney, the blood granules were present in the proportion of one to three. In another patient, Eliza S., aged twenty-one, suffering from the same condition, who was examined on many occasions and whose blood was shown at the Royal Medical and Chirurgical Society in contrast with my own, the granules were found in ratios of from one to six up to one in two, and on one occasion they were as numerous as the red cells. I also examined the urine of Eliza S., and found a great excess of uric acid, on one occasion as much as one to twelve (*i.e.*, one of uric acid and twelve of urea), a relation never met with under normal conditions. I mention this especially because it has been asserted by some that renal disease prevents the excretion of uric acid; yet in this patient, whose kidneys had probably not a single normal cell in any part of their substance, and whose urine under the microscope showed an immense number of casts with extensive fatty and degenerative changes, the excretion of uric acid was much in excess of the physiological limit. The explanation of this is simple, for we have here advanced disease with great debility, cardiac failure, general anasarca, and subnormal temperature; as a result, the

alkalinity of the whole body is increased, and the blood is flooded with uric acid which passes freely through the kidney into the urine; and the most utter and complete destruction of kidney tissues will not under these conditions prevent its passage, because the excretion of uric acid is much more dependent on its solubility than on the structural integrity of the kidney. In four other cases of chronic Bright's disease in adults from thirty-eight to sixty-three years of age, the proportion of granules was one to four in two of the patients and one to three in the other two.

In chronic arthritis, gout, and rheumatism I have obtained relations of one to one, as in the case of chronic gout with chronic Bright's disease mentioned in "Uric Acid," fourth edition, p. 410. The blood of this patient was examined on many occasions for comparative purposes, and always with practically the same results, the proportions being from one in one to one in four. But the ratio more commonly found in chronic arthritis is one to six, as in the case of D. M. M., aged fifty-two, suffering from chronic arthritis with depression. The patient above mentioned who gave a ratio of one to one had, in addition to Bright's disease, uratic deposits in various parts of his body; they were plainly visible on his fingers, ears, etc. He was a butcher by trade, which, no doubt, accounted for it all. In the case of Samuel H., aged thirty-five, a victim of chronic gout for fourteen years and showing numerous tophi, the proportion was one to two.

In fever we find such results as the following: "William D., aged twenty, ninth day of enteric fever, ratio one to thirty; Lucella T., aged thirteen months, meningitis, temperature about 101° F., ratio one to fourteen, a relatively small number for a child; and Alice W., aged ten, fifth day of pneumonia, temperature 103° F., ratio one to twenty-two. Florence T., aged twenty-three, a very debilitated and anæmic woman, suffering from malaria, with enlarged spleen, had—(1) in an afebrile period between two attacks a ratio of one to three, and (2) in an attack with temperature of 104° F., which followed later, a ratio of one to nine. No doubt but for this patient's extreme debility there would have been a much smaller number both in the febrile stage and during the intermission; but when fever occurs along with debility it does not diminish the excretion of uric acid in the urine nearly so much as the same rise of temperature supervening in a stronger person.

We see, then, that during periods of rising temperature, such as the early days of enteric fever, when the excretion of uric acid in the urine is diminished, we also find a small number of granules in the blood, a condition analogous to the diminution in the number of blood granules accompanying decrease in the excretion of uric acid the day after the withdrawal of a salicylate.

We have now seen that in pathology these granules are numerous in the blood in those conditions (gout and Bright's disease) in which it is known to contain some uric acid and are very scanty in the blood in that condition (fever) in which it is not supposed to contain any. In physiology we see that their number varies from day to day and hour to hour with the excretion of uric acid in the urine. And in drug action we see that it is possible to make these granules vary in either direction by using drugs that cause corresponding fluctuations in the excretion of uric acid in the urine; but that here again, as in all other conditions, if the quantity of granules in the blood does not alter, neither does the quantity of uric acid in the urine. In a word, in all three conditions the ratio of granules in the blood to the red cells is an accurate and reliable index of the amount of uric acid that is or soon will be passing in the urine.

I must not prolong this already too long paper by even enumerating the many directions in which further investigation of the blood granules seems certain to throw new light on the physiology and pathology of uric acid; but as to the nature of these granules, though it is apparently almost impossible to apply any decisive chemical test to them in minute quantities of blood under the microscope, the general trend of evidence is in favor of their being uric acid, and, if we acknowledge that they are uric acid in the pathological conditions in which it is well known to be present in the blood, we must also acknowledge them to be uric acid in all the other conditions of physiology and drug action.

The test is so simple and easy to employ at the bedside that it will, no doubt, come into general use. If it only tells us the probable quantity of uric acid that is passing in the urine, it none the less gives us in thirty minutes information which we should otherwise have to wait more than twenty-four hours to obtain, and as regards diagnosis it enables us in a still shorter time to identify the great excess of granules which accompanies such conditions as Bright's disease and uræmia.

Diseases of the Eye and Ear

FOREIGN BODIES REMOVED FROM THE VITREOUS CHAMBER BY THE ELECTRIC MAGNET; DOUBLE OPTIC NEURITIS; GLAUCOMA; INTERNAL SQUINT.

CLINICAL LECTURE DELIVERED IN JEFFERSON MEDICAL COLLEGE HOSPITAL.

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FOREIGN BODIES REMOVED FROM THE VITREOUS CHAMBER BY THE ELECTRIC MAGNET.

GENTLEMEN,—I show you this morning two cases that illustrate one phase of the progress made in ophthalmology during the past few years. Each of these men while pursuing his daily occupation received a small fragment of steel in his eye. In both instances sight was lost immediately after the accident, and if the offending substance had not been removed severe inflammation of the uveal tract would have supervened, demanding the enucleation of the affected eye for the relief of pain and for the prevention of sympathetic ophthalmia. It is a distinct gratification for me to tell you that in each instance the steel was removed, the eyeballs preserved, and the sight in part restored. Until the discovery of the X-rays and their utilization in ophthalmic surgery, the rule of procedure in such cases as these was to remove the eye, especially in the case of working-men who could not afford to sacrifice their time in the endeavor, often vain, to avoid the mutilation. In wealthier patients the expectant practice, looking towards the encapsulation of the foreign body, is perhaps justifiable, but in the great majority of cases the hope that the foreign body may prove innocuous is not realized, and after months of suffering the eye must in the end be enucleated.

CASE I.—A. B., fifty years of age, on October 11th, while working in an iron mill, received a wound in the left eye, which was followed by immediate loss of vision. He noticed an escape of fluid from the eye, and at the same time experienced severe shock from the pain. He secured medical advice, and for the next ten days was treated with the usual remedies for iritis and iridocyclitis. On examination ten days after the accident, the eye was injected and painful, the iris inflamed, the lens partially opaque, the vitreous clouded with opacities, vision reduced to the perception of light, the tension normal, and the eye sensitive to the touch. No wound indicating the point of entrance of a foreign body could be detected, yet, from the history given of the sudden loss of vision, of the subsequent inflammation, of the gradually increasing opacity of the lens, and of the clouds floating in the vitreous, it was quite evident that a foreign body either had passed through the ball into the orbit,

FIG. 1.



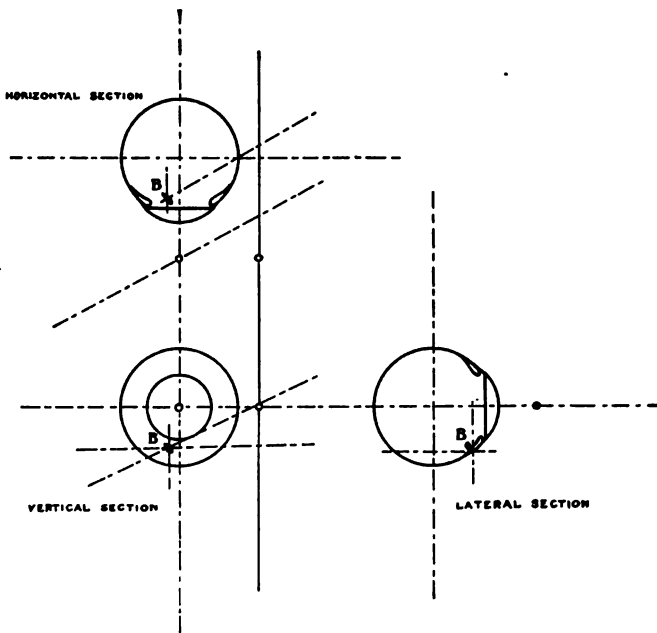
Sweet's apparatus applied to the patient preparatory to taking a skiagraph.

wounding the lens in its passage, or had entered the vitreous humor and was still confined within its boundaries.

Two questions presented themselves for solution,—namely, was the piece of metal still in the eye? and, if so, what was the exact site? The answer to both of these questions was determined

absolutely by means of skiagraphs and Sweet's method of localization. (Fig. 1.) Two separate exposures were made and the shadow cast by the foreign body was well marked in each of the skiagraphs. Dr. Sweet determined its site to be in the upper, inner portion of the ciliary body, and the diagnosis indicated by the signs was thus positively confirmed. (Figs. 2 and 3.) The following day an attempt to extract the steel by means of the electro-magnet failed. The second day, under ether, a further effort was made and this was successful. The tip of the magnet was introduced many times,

FIG. 2.



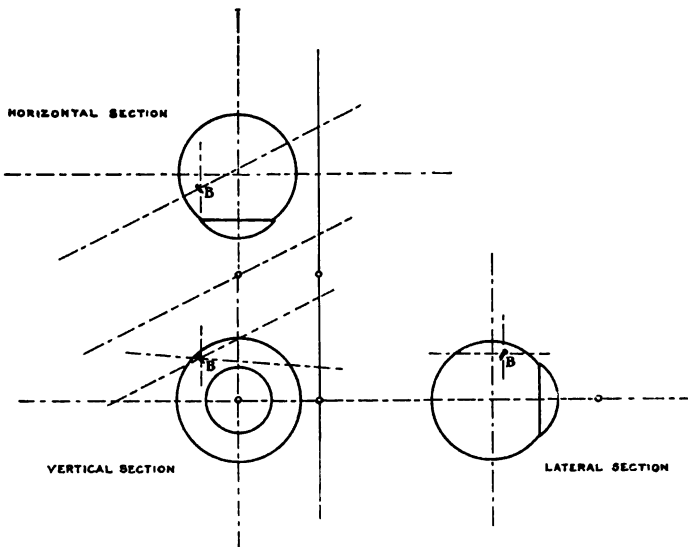
CASE I., Sweet's diagrams showing localization in the upper-nasal section of the ciliary body.

always under antiseptic precautions, and considerable vitreous was lost, but finally the steel was found embedded under inflammatory exudate in the site indicated by the radiographs. After introducing a scleral and a conjunctival suture the patient was put to bed and treated by constant applications of ice-water. No unusual reaction followed, and the man was discharged with a healthy-looking eyeball and with the preservation of the perception of light.

CASE II.—C. D., aged forty-five, while pounding on a piece of steel with a steel hatchet, suddenly felt sharp pain in the left eye

and noticed loss of vision. He was brought to the clinic the following day. The eye was injected; there was a small acute cicatrix in the upper portion of the cornea, and a sharply defined, irregularly outlined wound was visible in the superior quadrant of the iris; the lens was hazy and the vitreous filled with opacities, probably due to hemorrhage. The track of the piece of steel was clearly indicated by the wound in the cornea, the tear in the iris immediately behind it, the commencing cataract, and the hemorrhages into the vitreous. It was impossible to determine the exact site of the foreign body by other means than the X-ray pictures, which showed the presence of a piece of metal near the meridian of the globe on the nasal side. (Fig. 4.) The steel had passed through all the media and was lodged in the choroid or retina just back of a line dividing the ball into the anterior and posterior halves. (Fig. 5.)

FIG. 5.



Case II., Sweet's diagrams locating piece of steel in postero-nasal section of choroid.

Under strict antisepsis an incision was made through the sclera, and the magnet was inserted until its point reached the site indicated. A slight click was heard, and when the magnet was withdrawn the metal was seen adhering to it. (Fig. 4, A.) The wound was sutured and the same treatment instituted as in Case I. On

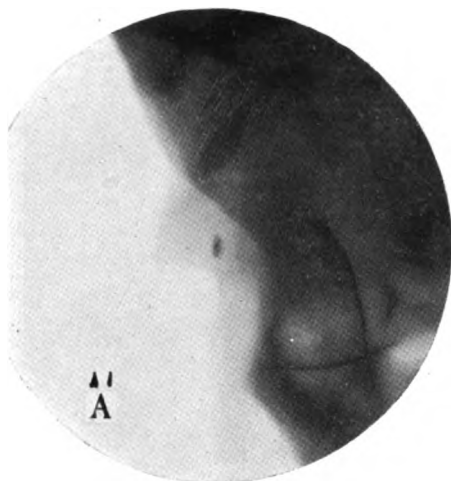


FIG. 3.—Skiagraph showing position of steel, and, A, two views of the piece of steel (natural size).

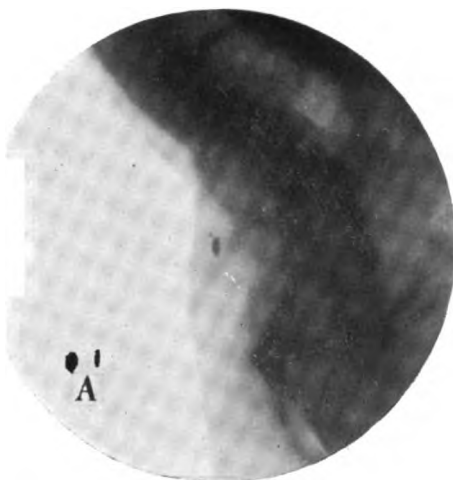


FIG. 4.—Skiagraph showing position of steel, and, A, two views of the piece of steel (natural size).

the second day after operation the man was discharged with an eyeball but slightly injected and vision of 20/100.

Cases in which the presence of metal in the eyeball has been diagnosed by means of the Röntgen rays and its removal accomplished by the electro-magnet are sufficiently numerous, and, unless some special addition to our knowledge in the matter of diagnosis or operative procedure be made, published reports are simply reiterations. I have brought these two men before you in order to impress upon you the essential for success in the treatment,—namely, the prompt application of the magnet. Each day that intervenes after the accident adds to the difficulty of withdrawal of the metal and to the probability of loss both of vision and of the eyeball. A foreign substance quickly excites inflammation, particularly if it is lodged in the ciliary body, and but a few days elapse before it is covered by exudation and thus placed beyond the reach of the influence of the magnetic current. In the first of the cases I have shown you two weeks passed before operative intervention. The consequences of the irido-cyclitis as well as the unusual traumatism of the operation will probably prevent the recovery of vision, whereas in the second case, in which only two days had elapsed, the metal was easily reached by the magnet, the traumatism was insignificant, and useful vision was retained. Should the lens become cataractous, as very frequently happens after wounds of this character, it may be removed and vision recovered. In both cases the eyeballs have been preserved and there is no reason for apprehending sympathetic disease.

DOUBLE OPTIC NEURITIS.

CASE III.—This patient is thirteen years old, is slight of figure, childish in her ways, and undeveloped, although she seems to be in good health. She came to the out-patient department some days ago complaining of daily headache. The headache was not dependent upon use of the eyes nor was it localized. It commenced in the morning and continued, without becoming very severe, until evening. She has had occasional attacks of vertigo and for the past two years has been subject to vomiting. The vomiting was independent of eating and was unattended with nausea. There is no unsteadiness of gait or want of co-ordination in any of her movements and no paralysis of any of the muscles. Vision = R. 15/30; L.

15/200. The ophthalmoscope shows a moderate grade of optic neuritis of each eye, with exudation or effusion sufficient to blur the outlines of the papilla and to cause its level to project perhaps one millimetre above the plane of the neighboring retina. The swollen disks are white, indicating that the exudate is a serous infiltration rather than a deposit of solid material. There are no hemorrhages on the disks or in the eye-grounds, and no indications of retinal or choroidal disease. The fields of vision are not limited for white or colors, and no improvement of vision can be obtained by glasses. Examination of the blood showed sixty-five per cent. hæmoglobin, but no other abnormalities; examinations of the urine made repeatedly showed no albumen, sugar, or other pathologic changes. Professor J. C. Wilson, who has studied the case and presented it before you, believes that the cause of the choking of the disks is an intracranial neoplasm. He bases his diagnosis upon the history of nearly constant headache without ocular causes, upon the repeated vomiting without nausea, which is a characteristic of reflex vomiting, and upon the occasional attacks of vertigo. He admits that the symptoms are not well defined and are not especially emphatic, being elicited only after thorough questioning; but, by exclusion of kidney disease, of any blood dyscrasia, of the history of acute fever, of tubercular meningitis, of specific disease either acquired or inherited, he is led to believe that the cause of the symptoms is as stated. The position of the growth in the brain is impossible to determine, since there are absolutely no localizing symptoms.

During the past week the patient has been taking ten grains of potassium iodide four times daily and mercurial inunction of one-half drachm morning and evening. Under this treatment the vision has improved in the right eye to nearly normal acuity and in the left eye to 20/100, while no change can be noticed in the degree or character of swelling of the optic papillæ.

GLAUCOMA.

CASE IV.—This man is fifty-five years old and is a subject of absolute glaucoma. The adjective is descriptive of that stage in which the eye is about to undergo the process of degeneration and in which the sight is hopelessly lost. In both of these eyes may be seen the classical picture of glaucoma: the ciliary congestion is

marked, the cornea is denuded of epithelium over its entire surface and its sensitiveness is lost, the anterior chamber is shallow, the pupil is dilated and fixed, the lens is in part opaque, the vitreous has lost its transparency, and no view of the eye-ground can be obtained. If the fundus were visible to the ophthalmoscope, we should see an extensive and deep cupping of the optic nerve, the blood-vessels abruptly curved as they pass down into it over the sclerotic ring, the lamina cribrosa evident as a gray and mottled centre occupying the main portion of the sunken papilla, the choroid around the disk atrophied, permitting the whitish sclera to shine through, the veins and arteries dilated throughout the fundus and pulsating on the disk. The tension of the globe is increased so that the eyeballs are stony hard, and the man suffers paroxysms of acute pain in the eyes and in the region innervated by the first and second divisions of the fifth nerve. He has no light-perception in either eye. His present deplorable condition is the result of an unrecognized and untreated acute glaucoma. In March, 1899, the left eye became suddenly painful and injected, and in the course of a few hours vision was materially reduced and in a day or two entirely gone. In June of the same year the right eye became similarly affected. Careful analysis of his history preceding the attack and of his physical condition since admission in the hospital fails to reveal the predisposing or exciting causes of the affection. He states that until his left eye became blind he was perfectly well and was able to perform his usual duties on the farm; that his sight had never been disturbed, and that he had always been able to use his eyes with perfect freedom and comfort. Barring the blindness he seems to be a perfectly well man to-day. Had the attending surgeon performed iridectomy or had he recognized the disease and, unable to operate himself, sent the patient to an oculist, his sight could have been saved.

Since the patient came under our care, I have instituted treatment by strong solutions of sulphate of eserine, which have contracted his pupils slightly, administered internally sodium salicylate, and given him daily profuse sweatings by means of hot baths and hypodermic injections of pilocarpine muriate. Two weeks of persistent treatment having been of no avail, I performed posterior sclerotomy in the left eye, making an incision through the sclerotic coat and expressing a portion of the vitreous humor. The tension

was greatly reduced, and, even after the union of the edges of the wound, remained nearly normal, but no sight returned. Having failed in the left eye, I deemed it useless to operate on the right.

I show you this sad case for two purposes,—first, to make you familiar with the appearance of glaucoma; and, secondly, to insist, should such a case come under your notice after you have entered into practice, that immediate treatment shall be instituted. Delay is dangerous; prolonged delay absolutely fatal. This man has now become a charge on his family or upon the State, he has been deprived of years of usefulness, and must pass the remainder of his life in darkness, for the want of prompt and intelligent medical attention. I trust that his case will so impress you that such responsibility will never be yours. The diagnosis of a case of glaucoma as well marked as this one presents no difficulties: the sudden acute onset, the violent pain, the dilated pupil, and the loss of vision are found in no other disease. The only lesion with which it might be confused is iritis, but in the latter affection, while the congestion and pain closely resemble those of glaucoma, the altered color of the iris, the contracted and irregular pupil, and the posterior synechiæ are too characteristic to admit of an erroneous diagnosis. In pre-ophthalmoscopic days glaucoma was not infrequently mistaken for cataract, but in later times no such confusion can arise.

INTERNAL SQUINT.

CASES V., VI., AND VII.—These three children have an identical affection; one of them demonstrates the value of early attention and the others the disadvantages of waiting until a perfect cure without operation is unattainable. The youngest child is thirty-four months old and has worn spectacles for two months with great advantage. She began to squint at two years of age, using either eye indifferently and both eyes part of the time. In other words, the squint commenced, like so many others, as a periodic squint, and before it became permanent, or before the child manifested a preference for using one eye, she had the cause of the strabismus removed by a retinoscopic correction of her hyperopia.

The two boys are respectively eight and ten years of age. The squint has become permanent and in each case is fixed in the left eye,—that is, the right eye is always used in fixation and the left eye always turns in. The mother states that the abnormal converg-

ence started at two years of age and gradually grew worse until the boys were six years of age, when the strabismus attained the degree that we now see. Each of them has a marked hyperopia that has never been accurately corrected. I venture to assert that, had they worn glasses at as early a period as this little girl, they would to-day have binocular fixation.

The cause of internal strabismus in hyperopic patients is, as is well known, the loss of the normal relation between accommodation and convergence, since the hyperope in order to see clearly must accommodate strongly, and, since excessive accommodation is incompatible with normal convergence, the eyes develop a tendency to turn in, and, again, since both eyes are never abnormally converged at the same time, the excessive convergence is borne by one eye while the other is used for fixation. It is good practice and in accordance with theory to adjust glasses to such patients at the earliest moment that they can be worn, thus relieving the accommodative effort and the excessive convergence. To wear glasses at the age of two and a half years may seem to you to be anomalous and ridiculous, but such feeling is mere sentiment and yielding to it a positive injury to young patients. The question may occur to you, how is it possible to induce a child so young as this to wear glasses? Her mother acknowledges that her first demand in the morning is for her spectacles. The child unconsciously admits by this demand that the correction of her optical defect and the relief of her convergence are essential to her comfort. Removal of her glasses, as you see, is instantly followed by return of the squint, demonstrating to the most sceptical their great value. In consequence of her mother's intelligent care, the child has useful vision in both eyes and will have no occasion for operation; the contrary obtains in the case of the two boys. We shall accurately correct their refraction under paralysis of the accommodation by atropine, order as near as possible a full correction, and watch its effect upon the convergence; but shall in all probability be obliged to acknowledge that the time has passed when glasses alone will be sufficient for a cure, and that resort must be had to tenotomy.

In reviewing four of the seven cases presented to you to-day, you will notice that the moral taught by each one of them is the necessity for prompt and appropriate treatment, and it is this lesson forcibly taught by these patients that I hope to impress indelibly upon your minds.

OPERATION ON THE MASTOID ANTRUM.

CLINICAL LECTURE DELIVERED BEFORE THE MEMBERS OF THE MISSISSIPPI VALLEY MEDICAL ASSOCIATION.

BY F. C. HOTZ, M.D., Chicago,

Professor of Ophthalmology and Otology in Rush Medical College, Chicago.

GENTLEMEN,—This patient had an operation performed upon the mastoid antrum by me on Tuesday last. The history of the case is so instructive that I thought I would bring the patient before you. He came under my care in July last with a subacute catarrhal inflammation of the left ear. The drum-head was perforated, and a copious amount of mucus continued to ooze through the perforation. While this ear was under treatment and was getting well, the patient complained occasionally of pain in the right ear; and finally, hearing on that side becoming impaired, an inspection of the ear was made, which showed decided bulging of the posterior upper portion of the tympanic membrane. A paracentesis was performed at once, when a copious amount of viscid mucus escaped, and the use of the catheter forced out still more; the wound in the drum-head was kept open, and solutions of boric acid and protargol were injected into the middle ear chamber through the catheter until the solution of protargol appeared in the external meatus. The secretion of mucus was finally stopped, the hearing returned, and the membrana tympani assumed its normal tension and color.

While the middle ear to all appearances improved, the patient still complained at times of pain shooting down the neck and of a swelling of the right side of the neck. He lost flesh and looked badly. Once he stayed away from the office two weeks because he had slight fever and his stomach was out of order. Finally, he was seized with darting pains extending from behind the ear towards the right eye. I suspected that there was something wrong in the mastoid bone; I thought that, although the catarrhal inflammation in the tympanic cavity had yielded to treatment very readily, there was probably a low inflammatory process going on in the

antrum. In passing my finger over the mastoid region I discovered an exceedingly tender point just at the posterior boundary of the mastoid bone. I examined the eye grounds, thinking the pain might indicate beginning meningeal inflammation, but found nothing abnormal. I explained the matter to the patient, saying that all his suffering, stomach trouble, etc., were due to inflammation in the mastoid bone, and advised an operation. To this he readily consented, and I operated last Tuesday. I found the bone quite hyperæmic; the antrum was small and filled with granulations, and a portion of the bone extending from the floor of the antrum towards the tip of the mastoid was softened and had to be removed by curetting. The cavity was packed with iodoform gauze, and the dressing has been left until the present time. The patient feels comfortable; his temperature has been normal ever since Monday; he has no pain. His head is free and clear, and there is no doubt that the condition in the mastoid was the source of the general disturbance; the operation confirmed my diagnosis in every respect.

The case serves as a good illustration of the fact that the mastoid antrum may be affected without one of the typical symptoms that indicate the presence of mastoid disease. There was no redness, no swelling, no tenderness over the mastoid; and the fulness and swelling, as well as the pain in the neck, are not among the pathognomonic signs of antrum disease. The condition that was revealed by the operation explains these symptoms. The inflammatory process was working from the antrum downward into the spongy tissue of the bone in the vicinity of the insertion of the sterno-cleido-mastoid muscle. Any inflammation of the mastoid bone in that region causes a swelling of this muscle. A subperiosteal abscess of the mastoid process is characterized by rigidity and swelling of the sterno-cleido-mastoid muscle. There were none of the typical signs of mastoid trouble, because the inflammation was subacute in character; when this is the case, it does not produce the severe and agonizing pain of an acute suppurative inflammation.

The wound looks clear and healthy to-day, and there is no sign of suppuration. We shall keep on the iodoform gauze a few days longer, then we shall change to boracic acid dressings, because, as you know, iodoform retards the growth of granulations. Under borated dressings granulation will proceed much more rapidly than under iodoform, and a healthy growth of new tissue is, of course,

necessary to fill up the antrum and make good the defect in the bone produced by our operation.

A few words on the technique of the operation. The hair should be shaved for a considerable distance behind and above the mastoid, and the whole area thoroughly cleansed with soap and water and then washed with alcohol. A perpendicular incision is made from the root of the zygoma to the tip of the mastoid. This incision should be at once carried through all the soft tissues of the periosteum, which is then detached with an elevator as far forward as the external meatus and backward far enough to expose a sufficient area of bone. I have never found it necessary to add a transverse incision extending backward from the middle of the perpendicular incision. Bleeding from arteries may be stopped by pressure, by forceps, or by ligatures. I always ligate the bleeding vessels at once. The soft parts are next drawn well back by sharp retractors and the exposed bone surface is examined for discolored spots. They show that the inflammation has advanced from the antrum through the outer wall to the surface of the bone, and at once indicate the site where the opening into the bone is to be made.

If the bone presents a healthy appearance, an opening is made at the prominence found in a line with and about one-half inch behind the external auditory canal, and continued inward and forward. Boring instruments, like trephines, have justly been discarded as unsafe; chisels and gouges are generally employed; some surgeons prefer rotary burrs, believing that chiselling causes injurious vibration of the skull. But if the chisel is held at an angle of less than forty-five degrees to the surface and the bone is shaved off in very thin flakes by the most gentle blows of the mallet, no such vibrations are imparted to the skull. During the progress of the operation a probe should constantly be used to detect any soft spot or small opening which may communicate with the antrum. When the antrum is opened, its contents are removed with scoops, all softened or decaying portions of its walls are scraped out with sharp curettes, and the overhanging edges of its outer walls are trimmed down with a chisel or suitable forceps in such a way as to make the opening in the bone cone-shaped, diminishing from without inward, to insure free drainage. When all bleeding has ceased and the wound has been thoroughly cleansed, the cavity is packed with iodoform gauze and a sterilized gauze bandage applied.

Progress of Medicine

DURING THE YEAR 1899.

BY HENRY W. CATTELL, M.D., AND N. J. BLACKWOOD, M.D.

THE medical year of 1899 will be conspicuous in the calendar of the century as one of broad and progressive development. While it is marked by no epoch-making contribution to science, such as Marconi's practical application of wireless telegraphy in the field of physics, the theories of previous years have been more fully elaborated and subjected to the test of practical application. There has been steady advance on these lines in all departments of medicine, and we are to-day prepared to state as fact much that but a short time ago was mere conjecture.

Probably the most generally interesting development has been that which has resulted from the study of the agency of the mosquito in the transmission of malaria and of the means to be employed to rid the world of this wide-spread disease. The late Spencer Cobbold once humorously remarked that, as the tapeworm came to maturity in man, it might be seriously argued that the destiny of the human race, in the scheme of impartial nature, was to be the host of the tapeworm. In the light of our present knowledge, it is found that he is the congenial and unconscious entertainer not only of the tapeworm, but also of many other parasites, which ill requite his hospitality by inflicting upon him many of the gravest diseases from which he suffers.

The advance in serum therapeutics gives us reason to hope that we shall before long be able to cure many diseases of bacterial origin; and, if the recent investigations of Elie Metschnikoff bear the promised fruit, senile decay will be hindered or markedly delayed.

The recent wars have afforded an opportunity to make exhaustive studies of the effects of gunshot wounds, and it would appear to be within the bounds of possibility that by simply regulating the

kinds of bullets used, we may one of these days be able either totally to destroy our enemy or simply place him *hors de combat* for a short space of time.

The discomforts incident to hernia have been considerably lessened by improved procedures for the radical cure of this affection; the operation of Bassini, with some slight modifications by individual operators, now ranks first among the many that have been proposed. The technique of intestinal anastomosis has been much simplified by the forceps brought forward by La Place.

As a consequence of the education of the general public in the matter of hygiene, public health is everywhere improving, and the value of general sanitary measures is universally recognized. Manson's apt remark as to what simple prophylactic measures can accomplish may be quoted here. "The tea-kettle, mosquito-netting, and the rat-trap are the preventives of three of the worst diseases which afflict mankind: the use of the first will prevent cholera, of the second the malaria, and of the third plague."

The knowledge of sanitation gained by years of patient investigation is now being put into practice in Cuba; and, as sanitary reforms are being carried out with energy and ability and the country has not yet been overridden by grasping and obstructive politicians, it will not be long before such cities as Havana and Santiago, formerly hot-beds of the worst forms of tropical diseases, will be able to point the finger of scorn at many of our own large cities, and serve as object lessons in municipal hygiene.

The study of tropical diseases has received unusual attention during the past year. Well-organized schools for teaching and investigation have been founded, many of them liberally endowed, as at Berlin, Hamburg, Liverpool, and London. State aid as well as individual money has rendered it possible not only to carry on the work at home, but also to send well-equipped expeditions into those places where the diseases to be studied are prevalent. This awakened interest in the subject is due not solely to the zeal in investigation displayed by medical men, but also to the demands of commerce. One case of plague at Honolulu does more to arouse public interest in America towards the importance of hygiene than the death of thousands in our midst from tuberculosis.

One of the advances of greatest promise in medicine of recent years has been the establishment of well-equipped clinical labora-

tories in connection with our hospitals, the director and his assistants being paid a certain fixed sum for their services. The good which can be accomplished by the careful testing of the sputum, blood, urine, stomach-contents, fæces, etc., is incalculable. The pages of the CLINICS will contain in the near future articles upon this subject, describing in detail all those tests which may properly be performed by the general practitioner himself.

The true value of Widal's test is now quite thoroughly understood. The characteristic agglutinative reaction will be found in practically all cases of typhoid fever at some time during the course of the disease. The mere presence of Widal's reaction proves neither the present existence nor the previous occurrence of typhoid fever. Response to the test may be elicited years after recovery from typhoid fever, and a small percentage of positive results is obtained from those suffering from other diseases. As an aid to diagnosis the reaction is, therefore, most useful; but it is not pathognomonic.

Complete surgical analgesia of the inferior extremities has been produced by injecting from one-sixth to one-third of a grain of cocaine, with sterilized artificial serum, by lumbar puncture into the spinal canal. Major operations, such as amputation at the hip-joint, resections of the lower extremities, and other surgical procedures lasting from thirty-five to fifty minutes, have been performed with no other anæsthetic.

Calot's method of forcible correction of malposition of the vertebral column in spinal curvature has many opponents and but few advocates. Even if the deformity be corrected,—certainly a great desideratum,—the operation is not curative; indeed, the tuberculous process is often spread thereby, or paralysis supervenes. For the latter reason, forcible correction should not be practised in the cervical region.

The approaching revision of the United States Pharmacopœia has not received in current literature the attention which it deserves. Animal extracts, antitoxins, and semi-proprietary medicines will require the most careful consideration.

The number of automobiles in actual use has considerably increased in our large cities. They will doubtless be more generally employed by physicians as soon as their cost is reduced to proper limits and repair shops are established at convenient places.

MEDICINE.

MALARIA.

GENESIS OF MALARIAL FEVER.—No subject has during the year excited more general interest in the medical profession than that of the transmission of malaria through the agency of mosquitoes. The experimental proof that the mosquito is one of the most important, if not the only, means of dissemination of this widely prevalent disease is certainly a notable achievement of modern bacteriological research.

Malaria is one of the most wide-spread as well as one of the most fatal of diseases. In tropical and subtropical countries there is certainly no malady that claims so many victims. For example, the statement is made on reliable authority, that in Italy malaria keeps nearly five million acres of ground from cultivation; it affects sixty-three provinces, and every year poisons about two million inhabitants and causes the death of fifteen thousand human beings.

It has long been a matter of common knowledge that malaria has been promptly banished from swampy districts in which it formerly prevailed by efficient drainage, but the reason of this was not known. The fact, too, that malaria is produced by certain minute parasites in the blood has been recognized for some time, but whence they came and how they effected an entrance have remained a mystery until recently.

Various investigators have been credited with having originated the theory of the transmission of the disease by the agency of the mosquito. In the Proceedings of the Philosophical Society of Washington, D. C., of February 10, 1883, appears a paper, by Dr. A. F. A. King, entitled "The Prevention of Malarial Diseases: illustrating, *inter alia*, the Conservative Function of Ague." After enumerating twenty theories or maxims relative to the genesis of malarial fever, the abstract proceeds: "It is generally admitted that facts unsusceptible of scientific explanation by the marsh fever hypothesis of Lanciscsi were capable of explanation by the theory that marsh fevers are produced by the bites of proboscidian insects, notably, in this and some other countries, by mosquito bites." A review of the natural history, habits, and geographical distribution of the mosquito was next presented in explana-

tion of the twenty statements there mentioned. In discussing one of these,—that of all human races the white is most sensitive to marsh fevers, the black least so,—it was maintained that the comparative immunity of the black races was largely due to color, the dark complexion of the skin being another illustrative instance of protective coloring so often observed in other animals, and that by it the negro was protected from the sight and consequently from the bite of the mosquito; a similar protection being further secured by the offensive odor and greasiness of his cutaneous secretions. In further support of the theory of the propagation of malarial fevers by the mosquito, numerous noted medical authorities were cited showing that, in all parts of the world where these diseases prevail, immunity could be secured by protecting the body from mosquito bites.

But to whomsoever the credit belongs for originating the theory, until within the last two years it was only an hypothesis, and we were still in the dark as to the life history of the parasite. Experiments had proved that malaria could be transmitted from one individual to another by the subcutaneous injection of blood containing the *Plasmodium malariae*, but we were in ignorance as to the ordinary modes of transmission of the disease and of the history of the parasites outside the body. Thanks to the labors and painstaking investigations of Manson, Ross, Koch, Bignani, Grassi, Bastianelli, and others, we now know the life history of the malarial parasite, the manner in which it enters the body, and hope soon to learn the practical means for its extermination. The work of Surgeon-Major Ronald Ross, of the Indian Medical Service, concerning the cultivation of the *Proteosoma lobbé* (one of the malarial parasites of avian blood) in gray mosquitoes, gave us the first convincing evidence that the mosquito is an agent by means of which malaria is conveyed from bird to bird, and probably from man to man.

As early as 1894 Manson suggested that the mosquito might be the intermediate host for the extra-corporeal form of the malarial parasite, just as it is for the *Filaria nocturna*, and that the manner of propagation for the two diseases might be the same. After enumerating several points of similarity between the *Filaria nocturna* and the malarial parasite, he continues as follows: "The parallel is very complete; the conditions, the requirements, and the problem to be solved are apparently identical for the two parasites. As the problem and conditions are the same for both organisms, the solution of the problem may also be the same for both. If this be the case, the mosquito having been shown to be the agent by which the filaria is removed from the human blood-vessels, this, or a similar suctorial insect, must be the agent which removes from the human blood-vessels those forms of the malarial

organism which are destined to continue the existence of this organism outside the body. It must, therefore, be in this or a similar suctorial insect or insects that the first stages of the extra-corporeal life of the malarial organism are passed. Manson held that the crescentic body of æstivo-autumnal malaria and the tertian and quartan spheroidal bodies which proceed to flagellation are the "extra-corporeal sporulating homologues of the intra-corporeal spore;" that the flagellum is the extra-corporeal homologue of the intra-corporeal spore; and he believed that the flagella, by means of their vibratory movement, penetrated the cells of some organ of the insect.

In 1895 Sakharov believed he had demonstrated chromatin in the flagella, and that the latter represented the chromatic filaments of the nucleus of the parasite. He held that the process of flagellation represented a modification of karyokinesis, the chromatin filaments breaking loose from the body and appearing as motile filaments. This observation has been recently confirmed by Bignani and Bastianelli.

At the meeting of the Accademia Medica di Roma, on April 30th, Drs. Bastianelli and Bignani thus summarized the results of their investigations on the cycle of life of the parasites of tertian fever in the *Anopheles claviger*. The large pigmented forms of the tertian parasites, incapable of multiplying in man, may be distinguished morphologically into two categories; some, with a large vesicular nucleus and little chromatin, represent the female (macrogameti); others, richer in chromatin, the male (microgametociti of zoologists). In the middle intestine of the male *Anopheles claviger* six microgamete (flagella) generally protrude, one of which fecundates a macrogamete after the chromatin of the latter has undergone a process of reduction. The fecundated macrogamete penetrates into the middle of the anopheles, where it develops, passes through a cycle of life similar to that described by Ross for the proteosoma of birds in the gray mosquito, and by the authors and Grassi for the semilunæ in the *Anopheles claviger*. In this cycle of life the tertian sporozoon remains distinguishable by its morphological characters from that of semilunar origin. The young are distinguished principally by the form of the sporozoon and the characters of the pigment, the forms undergoing development by the size of the bodies produced successively by nuclear division; the mature forms are distinguished, as a rule, by the disposition of the residue of segmentation, perhaps also by the size. The distinction of the species of the malarial parasites, therefore, remains unaltered. The same conclusion is also reached from the third experiment, which demonstrates that the semilunæ, which have given only tertian at first, pass through the anopheles in the Roman Campagna, and explains, in a

satisfactory mode, the behavior of the tertian at the change of the seasons. It has been demonstrated experimentally that very few punctures—indeed, even one only—by the infected anopheles may produce the infection in man.

MacCallum has demonstrated that the flagella represent sexual elements. He observed two forms of the halteridium, one with hyaline and the other with granular protoplasms; the former underwent flagellation, the flagella penetrating and being completely lost in the latter, and from this fertilized parasite an actively motile, conical organism was seen to arise. This organism pierces the red blood-corpuscles, allows the hæmoglobin to escape into the plasma, and sets the nuclei of the red blood-cells free, and it is thought that in this form it may escape into the outer world through the intestinal canal.

Ross continued his investigations by a study of the blood of birds infected with the malarial parasites. After the gray mosquito had fed on the blood of birds infected with mature proteosoma, the stomach wall of the insect always contained on the second day peculiar pigmented bodies embedded in its substance. These resembled coccidia in their structure. The growth of these coccidia was very carefully watched until, on the fourth day, the pigment vanished, leaving a capsule surrounding one or more large vacuoles. The coccidia continued to grow until the sixth or seventh day, when no further development was noticed until the twelfth day after feeding. Ross noted a peculiar striated appearance within some of the coccidia, while in others ten or twelve sausage-shaped structures could be seen. The problem as to how the parasites were enabled to enter the stomach wall remained to be solved. MacCallum's actively motile organisms, or pseudo-vermicules, furnished a possible solution, and these were found in the stomach of a mosquito killed within an hour after feeding on a crow infected with the halteridium, but he failed to find pseudo-vermicules in the stomach of mosquitoes infected with the proteosoma and the coccidia. Ross says, "Whatever that solution may be, however, there can be no doubt . . . that the coccidia constitutes the mosquito stage in the life history of the proteosoma."

Ross observed that there were two forms of coccidia, one containing innumerable thread-like bodies, the other containing large black spores. On the eighth or ninth day the coccidia rupture and set free these "reproductive elements" in the general body cavity of the mosquito, which contains so-called blood or circulating juice. He found large quantities of the thread-like bodies in certain gland-cells situated in the anterior part of the thorax. According to Ross, "This organ lies in the neck or the anterior part of the thorax of the mosquito, and

consists of a number of separate lobes. Each lobe is made up of numerous large cells clustered around a central duct and contained within a limiting membrane. The ducts of the several lobes ultimately unite and form a single main effluent. This runs up the under surface of the head, in the middle line, enters the base of one of the stylets or lancets of the proboscis,—namely, the central unpaired one, called the tongue or epipharynx,—traverses the whole length of it, and opens at its extremity in such a manner that the secretion of the gland must be poured into the very bottom of the wound made by the piercing apparatus of the proboscis. It is in the cells of this gland that the thread-like reproductive elements of the proteosoma-coccidia have the power of accumulating. How they manage to enter the cells from the blood I do not know; but it is certain that they can be found in them in large numbers, either floating separately in the grape-like cavity of the cells or crowded together within them in hundreds. It is impossible to mistake their identity."

Ross believed that this gland represented a veneno-salivary gland, and strongly suspected that the thread-like bodies, or germinal spores, were injected with the secretion of the gland in the bitten bird or amenable species, where they were capable of developing into mature proteosoma, thus completing the cycle of the parasite. This belief he proceeded to prove by experiment. Daniels later confirmed all of Ross's observations. As to the nature of the black spores, he thinks they are the "resting spores," and "that through them, by another cycle, the proteosoma can be propagated in conditions unfavorable for direct propagation by mosquito insertion into a warm-blooded animal."

It is not asserted that every mosquito can convey the malarial infection. According to Grassi there are three species, all belonging to the genus *Anopheles*, which are in this way a menace to the health of man. One of these, the *Anopheles claviger*, is, it appears, definitely associated, both as to the localities in which it occurs and the time at which it bites, with tertian malaria, whereas the two other varieties, the *Culex penicillaris* and the *Culex malariae* (a new species so named by Grassi), occur apparently invariably in the localities and at the time of year in which the æstivo-autumnal fevers predominate.

Bignani, an Italian observer, put the results of all these investigations to a practical test. He obtained some adult mosquitoes from the malarious region around Mascarese. The subject of the experiment was a young man who had never suffered from malarial fever, and who during a four years' residence at the Hospital of Santo Spirito had been constantly under observation and had never had fever of any kind. This man for nineteen days slept in a room in which from time

to time specimens of these mosquitoes were set at liberty, and was, consequently, often bitten. On the eighteenth day he began to feel unwell, and on the next day his blood was found to contain the parasites of malarial fever, of the variety prevalent at Mascarese. In summing up, Bignani says, "Everything points to the conclusion that inoculation is the only mode by which malaria is acquired, since air and water as carriers of infection may be excluded, and because arguments based on analogy all tend in the same direction. This much, at any rate, we can assert,—namely, that inoculation is the only mechanism of infection which has been demonstrated experimentally."

There is now experimental proof that two mosquitoes—*Anopheles claviger* and *Anopheles pictus*—are capable of conveying æstivo-autumnal fever to man, the former apparently more commonly than the latter. It is also conclusively shown that the *Anopheles claviger* is the carrier of tertian infection. It has further been demonstrated that the infection may be communicated by the mosquito to man and by man to the mosquito, thus completing the cycle of development and firmly establishing the mosquito theory.

EXPEDITIONS FOR THE STUDY OF MALARIA.—For the purpose of substantiating these latter theories, several expeditions were sent to those places where malaria is prevalent. Two of these deserve special mention. The one headed by Koch, Pfeiffer, and Kossel¹ studied in Italy from August 11 to October 2, 1898, æstivo-autumnal malarial fever, the identity of Italian and tropical malaria, and the transmission of the disease by blood-sucking insects. One hundred and twenty cases were investigated, of which thirty-two were ordinary tertian, five quartan, seventy-eight æstivo-autumnal, and five mixed infections. Three post-mortems were performed. Their conclusions are that æstivo-autumnal fever is originally of the same character as tertian fever, that it differs in no way from tropical fever, and that the variations that occur are due to the use of therapeutic measures. The deeper pigmentation of the organism was explained by the fact that it belonged to a later stage of the disease, and the peculiarities of the parasite were attributed to the methods which the Italians have used in its study. Koch does not believe that the half-moon form is a dying parasite, as the use of the valuable Romanowsky stain shows chromatin-like bodies and flagella which he considers to be spermatozoa. The malarial parasite in man is very similar to the proteosoma of birds, as described by Ross, who found coccidia-like bodies in the stomach and salivary glands of insects which had sucked the

¹ Deutsche med. Wochenschr., No. 5, 1899.

blood of infected birds. While in Berlin a year ago the writer was shown by Pfeiffer the worm-like organisms in the stomach and the coccidial bodies in the salivary glands of the mosquito. The fact that Rome, notwithstanding its situation in a malarial district, is practically free from malaria is not due to the air or the water, but is to be accounted for by the absence of sufficient vegetation in the city to support the presence of blood-sucking insects. In the adjacent gardens, where such insects are found, malaria is present. In June the number of cases of malaria regularly begins to increase, while but few occur during the winter. In two cases Koch saw beneficial results from the use of methylene blue.

While in Italy he also studied the Texas fever of cattle, and found the ticks which are the transmitters of the disease.¹

The expedition sent out by the Liverpool School of Tropical Diseases, including, among others, Major Ross, Dr. Annett, and Mr. E. E. Austin, started for Sierra Leone on July 29th. The full report of their investigations has not yet been published, but enough has been learned to confirm all that has here been stated.

METHODS OF DESTROYING MOSQUITOES.—The problem which now confronts us is how to rid the world of those varieties of particular species of mosquitoes which harbor the parasite, and so put an end to malaria. These insects live in and around isolated natural pools and puddles, which are used by them as breeding places. It is not proposed to attempt to exterminate the adult winged parasite-bearing mosquitoes, but, by finding out where they breed, to destroy the larvæ. These larvæ can be easily distinguished, as they float flat on the surface of the water, where they remain for a week during the process of development. Ross advises their early destruction by draining the pools that form their nurseries; these are always circumscribed, and so are easily drained, such collections of water being chosen because they contain no minnows, which feed upon the embryo mosquitoes. Multiplication of the dragon-fly is also to be encouraged.

Celli and Casagrandi discuss most interestingly the various methods of destroying mosquitoes. To kill the larvæ we have sulphurous oxide, permanganate of potassium with hydrochloric acid, powders of the unexpanded flowers of the chrysanthemum, tobacco, petroleum, formalin, certain aniline colors, etc. The cultivation of the chrysanthemum in malarial districts is recommended, and the killing of the larvæ in winter when they are fewest; to kill the mosquitoes, essential oil of turpentine, iodoform, menthol, burning of leaves of the eucalyptus, etc., are recommended.

¹ *Centralb. f. Bakteriologie*, September 29, 1899.

THE PLAGUE.

The daily newspapers and the medical journals of this country, as well as those of England and the Continent, have been devoting considerable space to the consideration of the plague and to its liability to spread and seize us in its clutches. There are two sides to every question, and this subject of the plague is no exception. There are some who have been predicting that the dread disease would soon be firmly established in our midst, while others have gone to the opposite extreme and declared that plague could never enter this country. Each side has had its supporters, and the rest of us have been ranged in intermediate positions. If we look at the abiding places of the plague during the past year, what do we find as regards their sanitary conditions? It has been of the worst. In Hong Kong, Poona, and other portions of India, Bombay, Calcutta, Mauritius, French Ivory Coast Colony, Egypt, Lisbon, and Oporto, we find most often that there is no sanitation, or, if any attempt has been made at it by the foreign governments or individuals, the task has been so herculean that only a beginning has been made, although they may have been working at it for years. Hong Kong, or rather Victoria, though strictly an English colony, is nevertheless crowded with Chinese and the other dirty races of the south of Asia, who cannot be taught sanitary and hygienic laws except by constant hammering for years. It therefore, in harboring this element, furnishes a nidus for all diseases which are fostered by filth and overcrowding; and, when it is known that for years the Chinese laundrymen have been accustomed to sleep on the soiled linen of their white employers, whether the former were sick or well, it can be seen how easily disease may be spread. Of Egypt, Sir J. Rogers says, "There is but one satisfactory way to safeguard a country against cholera, and that is to put it in such a sanitary condition that the disease will not find a favorable soil for its development. In this respect practically everything remains to be done in Egypt." And what is true of cholera is also true of the plague. The unsanitary condition of Oporto is notorious. Preventive medicine in Portugal is in a most elementary condition, and the ignorance and superstition of the population render special precautionary measures well-nigh hopeless.

Hence the question of invasion seems to resolve itself into this: If we keep our cities in a good sanitary condition, with adequate ventilation and plenty of fresh air in our houses, we have nothing to fear from the plague. A case might get into one of our coast cities, and, if allowed to remain in some dirty and overcrowded tenement-house district, might develop other cases; but a general epidemic seems im-

probable. There would be no cause for a panic even if the scourge were to sweep over Europe. Plague is a preventable disease, and with our modern methods of sanitation it could be kept in check. One recent writer aptly says, "If we were called upon to choose between the plague and any one of a dozen other diseases which we have always with us, we would gladly invite the former. Diphtheria kills more in a year than the plague could destroy in a civilized city in a decade, and, if we would call the disease bubonia, or by any other name than plague, there would be little alarm inspired by its approach."

Probably the worst epidemic of the disease this year was at Poona, a town of over one hundred thousand inhabitants, which up to the middle of the fall had had twenty-three thousand three hundred and thirty-one cases and seventeen thousand eight hundred and nine deaths. There were ten hundred and eighty-six deaths in one week, and one hundred and seventeen cases and one hundred and ten deaths reported in one day.

India necessarily occupies the most conspicuous position at the present time in any outbreak of the plague. The disease still rages there at different places with great severity, as is shown by the fact that from five to six thousand deaths from plague are reported every week. The knowledge of the disease which has been acquired during the present epidemic has served to modify considerably some of the views which were held by the older authorities in regard to the importance of personal contagion as the chief means of its spread. A well-managed plague hospital, in which due regard is paid to the provision of ample space, ventilation, and the maintenance of hygienic conditions, is no more dangerous than any other locality would be within a plague-infected district. It is probably much less so. As a matter of fact, the members of the medical and nursing staffs and the visitors to such institutions incur little or no more risk of contracting the disease than other persons resident altogether outside them, whose duties have not brought them in contact with the hospital or its inmates. The malady exhibits localizing tendencies and persistently manifests its infectious nature within very circumscribed limits. Neither the complete life history of the plague bacillus, nor the conditions most favorable to its existence and propagation, nor the ways in which it effects an entrance into the human body have, however, yet been fully ascertained.

One thing seems clear,—plague is not a water-born disease. Some think, with Dr. Patrick Manson, that it is disseminated by rats, and there is abundant evidence that these vermin are instrumental in its spread. Rats are themselves undoubtedly highly susceptible to plague infection, and, as they gnaw the dead bodies of their kind, the pesti-

lence spreads very quickly among them and may ultimately be conveyed to man. Buildings and localities where rats are found to be dying should be evacuated at once and an effort made to exterminate the animals.

Local insanitary conditions may be regarded as the nurses rather than as the parents of plague. Their existence invites the disease and affords a foothold for its persistent development and spread. The disorder may be regarded as endemic in Hong Kong, and it has spread to India, whence it has gradually extended westward to Persia and Astrakan, to Mauritius, to East Africa, to Rio Janeiro, and finally to Portugal, which has been free from the disease for over two hundred years.

Harold W. Bruce, late medical officer and attaché at Bombay, contributed to the October *Lancet* an interesting article on the principal characters of the plague epidemic in India. He says the most remarkable feature of the epidemic has been the appearance of a variety of plague which had apparently never before been fully recognized; he refers to those cases in which the primary seat of disease is in the lung. Pneumonic plague has constituted about seven per cent. of the total number of cases, and possesses especial interest on account of its being almost invariably fatal. While the symptoms of a typical case of plague are quite characteristic and could hardly be confounded with those of any other affection, the general course of the disease resembles that of other acute fevers which are the result of an intoxication by the poisonous products of micro-organisms. Plague is characterized by the extreme severity of the intoxication. In the present epidemic the mortality has been between seventy and eighty per cent. of all cases. With regard to the duration of the incubation period, there is not much certain evidence except as regards its limit. A detention in quarantine for ten days has been practically always successful in eliminating the infected cases, and that may, therefore, be regarded as the maximum period. It may be as short as two days; from five to six days is probably the average duration of this stage. The disease principally attacks young adults; young children usually escape, and the same is true of people over fifty years of age.

One item in the report of the German Plague Commission calls for comment. That report attributes the exemption of the white population to the greater protection afforded by their clothing, and states that the evidence seems to show that abrasions or perforations of the skin, even of the most insignificant character, afford the plague bacillus a point of entrance into the body, whereas the poison is much less readily absorbed through the lungs or the digestive organs. In answer

to this it may be stated that abrasions of the skin have been most carefully looked for and investigated, and in only a very small proportion of cases has it been thought possible that the plague bacillus entered by these avenues. Moreover, the glands of the groin are as often affected among the white population who clothe their feet and legs as among the natives. There is hardly an instance to indicate that the poison was absorbed through the digestive organs, and the small number of nurses, attendants, ward-boys, and relatives and friends of patients who have been attacked shows that it can seldom be taken in through the lungs.

The local inoculation theory would afford an easy explanation for the spread of the disease if it could be shown that it was generally true. At the present time only a few cases can be explained on this hypothesis. It must be admitted that the manner of dissemination in the majority of cases is unknown. Why some villages have been decimated, why the large cities have been attacked at a rate, roughly, of one in forty of the population, and why other places have escaped lightly, are problems which remain to be solved and are not disposed of by the theory of local inoculation.

Throughout the East the mooring-ropes of ships are furnished with a funnel-like collar that renders it impossible for rats and snakes to get aboard by these avenues.

Colonel Lawrie, plague commissioner in Haidarabad, stated that the first indigenous case occurred in January, 1897. The measures adopted were evacuation, disinfection, and the burning of floors and walls in kilns. Haffkin's fluid was not a serum, but a putrescent organic liquid containing micrococci of putrefaction and occasionally pathogenic organisms. Inoculation had not been adopted. The burning process was found satisfactory. Mr. Stevens, deputy commissioner, reported that sixty-eight villages in Haidarabad territory had been attacked in 1898. After burning in kilns, no bacteria were found in the ashes and the plague never reappeared in the villages. The classes most affected were low-caste Hindus. Age and sex had no apparent influence. Out of six bottles of Haffkin's fluid five showed a distinct growth and the other was doubtful. Colonel Lawrie admitted that the fluid as now used afforded considerable protection, but denied that it gave immunity. Sterilization he thought might render it useless.

Plague is peculiarly tenacious of life, and where it has once manifested itself it may reappear from time to time. This has been a marked feature throughout the present epidemic. For example, at Alexandria ten days after the plague had apparently ceased it broke out afresh; this is but one instance of its treacherous nature.

Dr. Ferras, who had been in practice since 1853, expressed the opinion before the Plague Commission, on January 4, 1899, that there had never been plague cases in Calcutta, but simply cases of malignant fever. He had seen similar cases which were indistinguishable from plague except bacteriologically. There had been no bacteriological experts in India since the time of Dr. Cunningham. Unless Calcutta was improved structurally, the *bustis* cleared, and the overcrowded areas opened out, there was no likelihood that malignant fever would disappear. Captain Bingley recommended municipal camps, one of which had been used very successfully in his own district. The plague increased after the export of grain, because the rats then spread through the town in search of food, carrying the infection with them. There was abundant evidence that the tenacity with which epidemics clung to localities was influenced by geological formation.

THE PLAGUE IN PORTUGAL.—When the plague first appeared at Oporto, Portugal, last summer, great deception was practised, the merchants and the papers denying its presence. It was due to the skill and the conscientiousness of Dr. Jorge that the disease was diagnosed and published to the world as the plague. Immediately after this announcement his house was looted, he was stoned in the streets, and only escaped assassination by the merest chance.

Dr. Camara Pestana, of Lisbon, an author of many interesting papers on bacteriological subjects, died from the plague, contracted while studying the disease at Oporto.

INOCULATION AGAINST THE PLAGUE.—Professor Calmette¹ obtained admirable results, both prophylactic and curative, with the serum procured from the Pasteur Institute. From the beginning he had to contend with the prejudices of other foreign medical men, especially Germans, who were still prejudiced by the incomplete results obtained in Asia by M. Yersin with his serum. Professor Calmette's serum was obtained by very different methods employed by M. Roux. Its use at once gave such satisfactory results that the Portuguese medical men, though sceptical at first, gave him every facility for trying it in the hospital at Oporto. The result was that the mortality fell from forty-three per cent. to fourteen per cent. or less. He could give no assurance that the plague would not spread from Oporto, and was of the opinion that even if no new human victims presented themselves, it would be some time before the disease would cease among rats and mice. If plague were introduced into France, he thought, it could be as easily isolated as at Vienna. Since infection by rats is so difficult to prevent,

¹Lancet, 1899, vol. ii., p. 189.

he emphasized the importance of their extermination, and expressed the belief that inoculation would certainly limit the epidemic.

The use of an organic fluid obtained directly or indirectly from the bacillus of the plague as a prophylactic in this disease has already led to most successful and even brilliant results. It must be regretfully admitted that the trials made of similar fluids as curatives have hitherto met with little or but partial success. Careful experiments have now been made with about four different fluids of this kind in the treatment of plague. They are associated with the names of Haffkin, M. Yersin, Professor Lustig, and M. Roux. The Haffkin fluid is now being widely and successfully employed in India as a prophylactic. It was originally intended for a curative, but experiment demonstrated not only that it possessed no value in this respect, but that its effect, if anything, was detrimental. It was, therefore, practically discarded as a curative agency.

Haffkin's fluid is a pure growth of the plague bacillus in which the organisms themselves have been killed by subjecting the growth to a temperature of 58° C. for one hour. It contains the dead bodies of the non-viable bacilli and the chemical products of their growth, which are apparently uninjured by exposure to this temperature. The other three fluids are all derived from the blood-serum of the horse to which repeated injections of a culture of the plague bacillus have been administered. Some difficulty is being experienced in India in the use of these serum preparations, because the natives fear that they may be of vegetable and not of animal origin, and therefore forbidden by their religious doctrines.

Lord Curzon, Viceroy of India, made a circuit of the plague hospitals and segregation camps at Poona. While disclaiming any medical or scientific knowledge to warrant his speaking authoritatively, he said he failed to see how it was possible for any one to argue that inoculation was not a wise and necessary precaution, when reliable statistics show that from seventy per cent. to eighty per cent. of the uninoculated perish from the plague while from seventy per cent. to eighty per cent. of those who have been inoculated are saved. Mr. E. H. Hankin, in his interesting pamphlet on "Bubonic Plague," says that, if plague is in the neighborhood, the wise man has himself and his family inoculated against it, whether they are likely to come in contact with infected persons or not.

DISINFECTION OF COW-DUNG AND MUD FLOORS.—Dr. E. L. Marsh presented to Mr. Haffkin a report on the result of experiments made to determine the efficiency of perchloride of mercury, alone and in connection with sea-water, as a disinfectant for cow-dung and mud

floors. He states that the disinfectant employed in Bombay for house disinfection consists of perchloride of mercury twenty-one parts, ammonium chloride fifteen parts, hydrochloric acid one hundred parts, and water three hundred and forty parts. Five ounces of this mixture are diluted in a gallon of water, which gives a solution containing the perchloride in the proportion of one in seven hundred and twenty-five. It is shown that one hundred square feet of floor space, calculating only a depth of one-sixteenth of an inch, would require approximately eight gallons of this acid solution to damage vitally any contaminating plague micro-organisms. But as the perchloride of mercury solution has only a surface action, if the contaminating material were below the immediate surface, or on the surface and protected by leaves, bits of rag, etc., this spray would have very little effect. The application of sea-water before spraying with perchloride of mercury solution is of no greater advantage than the addition of a chloride to the solution of the mercuric chloride. The use of sea-water has certain disadvantages, owing, first, to its being an approximately alkaline solution and as such adding to the factors against which the perchloride of mercury has to contend, and, secondly, to its containing an abundance of organisms, the destruction of which would in part impair the energy of the disinfectant solution. Dr. Marsh, however, found that electrolyzed sea-water sprayed on the infected cow-dung was a valuable adjunct to perchloride of mercury in the disinfection of native floors, not so much for its germicidal action as for its power of *oxidizing and neutralizing* the basic ingredients of the mud and cow-dung which interfere with the efficiency of the perchloride of mercury.

TUBERCULOSIS.

The subject of tuberculosis, always of great interest to medical men and laymen alike, has probably occupied a more prominent position in public discussions during the past year than ever before. The explanation of this may be ascribed to two reasons: first, the meeting of the International Congress on Tuberculosis in Berlin in May, and, secondly, the wide-spread introduction of the so-called open-air treatment of the pulmonary variety of the disease. At the International Congress much valuable information was given concerning the distribution, etiology, and prophylaxis of tuberculosis, and also a few useful hints concerning treatment, although in the latter department no very striking announcements were made. Dr. Köhler's address brought out afresh a peculiarity in the incidence of tuberculosis in Germany. Compared with the numbers living at each age there was found to be a progressive increase with advancing years in the incidence of pulmonary tuberculosis,

so that the heaviest mortality occurs at ages ranging from sixty to seventy years. Dr. Sabjerner showed that in the German army the mortality was greatest in those corps which were recruited from densely populated districts; and that, whereas workers indoors (regimental bakers, musicians, and the like) showed a large proportion of phthisical cases, in the active troops (infantry, cavalry, artillery, and pioneers) there was a heavy sick list, but very little tuberculosis. In all civilized countries the mortality from tuberculosis appears to be falling, especially that from pulmonary tuberculosis, although the improvement is most marked where the most systematic efforts have been made to combat the disease.

It is no longer a matter of doubt that the bacillus of Koch is the chief cause of tuberculosis, although to what extent the clinical features of phthisis are due to other associated bacteria is still a matter of dispute. In this respect Pfeiffer holds different views from those advanced by Kingston Fowler and others. He believes that the hectic fever of phthisical patients is entirely due to "mixed infection." There was a general consensus of opinion that tuberculous milk was a most important cause of tuberculosis in man, and that, besides the governmental work, much could be effected if every one insisted on being supplied with milk from tuberculin-tested cows. An important communication from Obermüller dealt with the question of the tubercle bacilli in butter. From the experiments of Obermüller and Rabinowitsch, confirmed recently by Koch, it appears that undoubted living tubercle bacilli may be found in butter, and the former recommends that the butter be made from pasteurized milk, as being much safer and more economical. According to Schumburg, tubercle bacilli are only found in butchers' meat when there is advanced disease with cavities; but lymph-glands and tracts are frequently affected, and tuberculous material may be smeared over sound portions of the animal. Flügge insists on the identity of the bacillus of mammals with that of man, while the identity of avian tuberculosis was not established. He regards the tubercle bacillus as the sole cause of all symptoms of tuberculosis in man, and considers the bacillus as an obligate parasite in man and animals, excluding purely artificial cultivations.

Fränkel pointed out that the chief danger of transmission was in the immediate neighborhood of the patient, as light and desiccation speedily kill the bacillus. It was recognized that the chief danger of transmission lay in overcrowded and dirty rooms and in dusty work-rooms. Leube advocated the use of wadding masks during the bed-making and cleansing of rooms in hospitals and the like. He regarded segregation of phthisical patients in general hospitals as more needed

in the interests of the patients themselves than to prevent spread of infection. Löffler argued that inheritance of the disease might be disregarded as only a pathological curiosity, while an inherited tendency, although probable, had not been proved. Roth showed the importance of early diagnosis and the value of sanatoria. He was in favor of medication of cases of tuberculosis under most circumstances. He further advocated the separate disinfection of clothing used by phthisical subjects and thorough disinfection of bedding and rooms after death. Kirchner discussed the subject of the marriage of phthisical subjects. Every one is nowadays agreed as to the importance of properly dealing with the sputa of phthisical patients. Ritter von Weismayr recommended that the sputa should be thrown into the water-closet, or mixed with peat and burned or with lime and buried, and that random spitting should be prohibited.

An interesting paper was read by Malvoz on the bacteriological institutes in Belgium, which gratuitously examine sputa and disinfect rooms, half the cost being borne by the state. In order to teach phthisical members of the working class how to conduct themselves, it had been found necessary to erect a popular sanatorium in connection with one of these institutes.

As regards treatment, most interesting papers were read on "Climate" by Sir Herman Weber, and one by Coghill on the treatment at Ventnor. Iodoform was regarded by Kobert as the best remedy for surgical tuberculosis, and orthoform and lactic acid for laryngeal complications. Miliary and galloping tuberculosis were considered to be incurable, while cases of ordinary phthisis could be readily arrested by the hygienic and dietetic methods associated with Brehmer's name, aided by ordinary symptomatic treatment. Kobert and Lauderer both praised the use of cinnamic acid to provoke leucocytosis. Brieger still regards tuberculin as useful in early stages, and is supported by Campana, of Rome, and by Denys, of Louvain, who uses a special preparation. The use of antituberculous serum as prepared in America was advocated by de Schweinitz, who also quoted Stubbart in support. To sum up, the general impression left by the Congress was that, while no specific has yet been discovered, we have in the shape of systematic treatment by hygienic measures, especially in suitable sanatoria and health resorts, most potent and sufficient means of treatment in all early uncomplicated cases of phthisis, while still more is possible in the way of prevention.

At a recent prison congress in New Orleans, Dr. Blake, physician inspector at the Alabama Penitentiary, called attention to the fact that phthisis is greatly on the increase in prisons in the South. Taking his

own State, he quoted statistics to show that in sixteen years the percentage of convicts dying from phthisis had risen from seventeen per cent. to nearly thirty-seven per cent., while during one year, 1895-96, more than fifty per cent. of the deaths in the penitentiary had been from that disease. The same was the case, as to increase, in Mississippi, Texas, Georgia, Virginia, and other States. The trouble, he thinks, lies in the fact that tuberculous and non-tuberculous convicts are herded together, especially in the winter months.

The Marine Hospital Service is making preparations for the treatment of all sailors of the merchant marine who are suffering from tuberculosis, at the new marine hospital now in course of construction on the abandoned military reservation at Ft. Stanton, New Mexico. The hospital is to be furnished with modern hospital furniture and all modern instruments and apparatus for the scientific treatment of phthisis. The out-door life in this climate is expected to have a most favorable effect upon the patients. Light employment in cultivating the soil will be given to those desiring it, and the patients will raise the greater part of the necessaries required for food.

PROPHYLAXIS OF TUBERCULOSIS.—Dr. Joseph Priestly,¹ the medical officer of health of Lambeth, in a report on the nature and preventability of tuberculosis, makes the following wise suggestions: (1) That a circular letter be sent to all the medical men in Lambeth, pointing out that the vestry is prepared to disinfect, free of cost, all rooms (with their contents) recently occupied by patients suffering from tuberculosis. (2) That a circular letter be sent to the persons in charge of public institutions, pointing out the nature of tuberculosis as a disease and the importance of adopting means to prevent its spread, and offering disinfection, free of cost, by the vestry's officers where it may be necessary. (3) That a circular letter be sent to the occupiers of those houses in which deaths from tuberculous diseases are reported, offering disinfection by the vestry. (4) That leaflets pointing out the danger of the disease and the ready means at hand for its prevention be sent to clergymen, district visitors, school-teachers, and others who from their position may be expected to have opportunities for disseminating the information.

Noel Bardswell² gives an account of a six-months' trial of the open-air treatment of consumption in the Sheffield Royal Infirmary. The results speak loudly in its favor.

From Rome³ we hear of plans for a "Crusade against Tubercu-

¹ *Lancet*, 1899, vol. i., p. 47.

² *Ibid.*, p. 1409.

³ *Ibid.*, vol. ii., p. 1291.

losis." Here Dr. Achille De Giovanni proposes to look into the sanitary condition of educational institutions; to regulate the matrimonial relations; to provide for recognition, isolation, and cure of tuberculosis; to provide means to prevent its development in sanatoria; to educate the "masses," and look after the physical, moral, and economic welfare of all classes.

HYGIENIC TREATMENT OF PHTHISIS.—In reference to the open-air treatment for consumption now associated with the name of Dr. Brehmer, of Görbersdorf, we find that as early as 1840 this same treatment was strongly advocated by the late Dr. George Bodington, of Sutton Coldfield, near Birmingham, England, in a small book entitled "The Treatment and Cure of Pulmonary Consumption." He met with such violent and bitter opposition by the profession that patients became averse to undergo the treatment, and he was thus unable to pursue his investigations. Six years later Dr. John Hughes Bennett became a convert to Dr. Bodington's views, and supported them in "Reynolds's System of Medicine." In 1857 the work of Dr. Bodington was favorably reviewed by Dr. Richardson, and within two years we find Dr. Brehmer opening the first sanitarium on Bodington's principles and working out his system into a carefully thought-out organization. From this point the success of the treatment has been continuous, and we are now loudly praising a practice which was proposed at least sixty years ago, and then condemned in the most bitter terms.

From the observation and careful study of over ten thousand cases in private practice and in the Royal National Hospital for Consumption and Diseases of the Chest at Ventnor, J. G. Sinclair Coghill makes the following interesting report. Recognition of the tubercle bacillus as a specific infectious element, and the researches into its natural history, associated for all time with the name of Robert Koch, first permitted the foundation of a rational system of treatment of pulmonary tuberculosis on the basis of a sufficient and determined pathology, and a direction and precision were given to the therapeutics of tuberculosis which previously had been speculative and chimerical. We know for certain that the disease is not only amenable to treatment, but that it is even in its completed stage capable also of self-arrest and cure. Indeed, without the consciousness of the patient to recognize and possibly to imitate the methods and to reinforce the influences by which nature accomplishes this result, constitute the *rationale* of the hygienic treatment of patients. He says the principal conditions of this treatment are to be considered under the following heads: first, rest—absolute repose, if possible—of body and mind; and, second, the temperature of the air, which is more important as regards its equability than in rela-

tion to its range, which should not be allowed to vary much above or below 55° F. If these conditions, with due precautions, can be secured in the open air, so much the better. If the patient is confined to a room, this should be well ventilated and freely exposed to air and sunshine, with the windows and if possible the doors open day and night and with the beds standing well out from the wall. Third, conversation, especially on exciting or depressing topics, should be avoided, but the patient should be encouraged to occupy his mind by the perusal of light and cheerful literature. We should bear in mind the educational and intellectual differences of the sick, and remember that those who are less cultivated, having fewer intellectual acquirements to fall back upon, are more apt to brood and despond. Fourth, the general bath should, of course, be prohibited, but, if possible, the whole body should be sponged over, night and morning, by the nurse with eau de Cologne, spirit of wine and hot water, or toilet vinegar; this not only comforts and refreshes the patient greatly, but it also has a favorable influence on the temperature.

In a very interesting article, in the *North American Review*, upon the tuberculosis problem in the United States, Dr. J. A. Knoff makes the statement, to which most of us will agree, that pulmonary tuberculosis is not in reality a contagious disease. The contact *per se*—the touch of the invalid—is not capable of transmitting the disease. It is the ignorant, unclean, or helpless patient who, by his mode of disposing of his expectoration, endangers the lives of others. So it is more correct to call pulmonary tuberculosis only a highly communicable disease; and, we repeat, nothing whatever is to be feared from living or coming in contact with a clean and conscientious tuberculous invalid. Such words are likely to have considerable influence in calming the unnecessary alarm which has arisen in lay minds as a consequence of classing consumption among infectious diseases.

The new movement starts with two great initial advantages,—first, the comparative failure of other methods, and, secondly, its simplicity and, up to a certain point at least, its demonstrable utility. We need not recall the story of tuberculin or attempt to appraise the value of the new tuberculin. With the brilliant success of antitoxin in diphtheria in mind, it would be rash to say that the labors of investigators to find a remedy for tuberculosis are either misdirected or predestined to a complete sterility, but it will require strong evidence to bring tuberculin or any similar remedy into repute in the treatment of phthisis. What is wanted in phthisis is some treatment which can be applied at home, which can be brought within the reach of all classes, and which

is capable of easy application, requirements that this new method attempts to fulfil.

In the hygienic treatment of phthisis the patient is continuously in the fresh air, his nutrition is sedulously maintained at the highest point, and all available means are employed to harden the constitution and render it impervious to the invasion of the tubercle bacillus. At the German sanatoria the patients spend their days either in exercise or resting upon protected balconies and in specially constructed shelters, and the internal arrangements of these institutions are such that even at night the patient breathes air of almost absolute purity. The hygienic treatment of phthisis relegates drugs to a very subordinate place. In some of the German sanatoria cod-liver oil, creosote, and guaiacol do not find any place in the list of therapeutic resources. In the hygienic method of treatment great attention is given to the state of the skin. Counter-irritation is still most favorably regarded in this country; also in France, where Professor Jaccoud especially has extolled it in the most unqualified terms. It is doubtful whether it does any good as a routine treatment, although it may have a temporary value where there are complications or pains of any kind. The German plan of friction by towelling, with tepid or cold sponge douches and baths, to keep the skin in a perfectly hygienic state, to tone it, to check night-sweats, and to prevent chills, we cannot doubt, speaking generally, is much to be preferred to the routine application of iodine or other counter-irritants.

The rapidity with which provision has been made in Great Britain for carrying out the open-air treatment of consumption bears eloquent testimony to the fact that this method has been successfully adopted in that country, and that the significance of its success is now widely appreciated both by the medical profession and by the laity. In a few years sanatoria will probably be provided for the poor, but in the mean time it remains for existing hospitals and institutions to determine to what extent they can play the part of sanatoria and at once give the poorer classes a chance to obtain the benefits of the open-air treatment.

At the recent meeting of the New York State Medical Society a resolution was passed asking the present legislature to adopt a measure for the establishment of a State hospital for consumptives. It appears that thirteen thousand lives are lost annually in the State of New York from pulmonary tuberculosis. Only one State in the Union—namely, Massachusetts—has a State hospital for consumptives. It was urged that ideal isolation can be secured only by State care, and that segregation should be employed among the poor by establishing special hospitals near the large centres of population. Thus far the cottage plan

of treatment in the Adirondack Mountains in the northern part of the State has proved most successful, and it is proposed to establish the State hospital for this class in that region.

Dr. L. Green recommends the preliminary inhalation of formalin as an aid to the open-air treatment of consumption. He says that formalin used in a vaporized state cleanses septic wounds. He reported in detail a number of cases in which more benefit was derived from treatment with formalin than from anything the patients had previously employed. He is of the opinion that the use of formalin combined with open-air treatment would quickly eradicate consumption, or at least make it a perfectly curable disease.

CHINOSOL IN THE TREATMENT OF PULMONARY CONSUMPTION.—Dr. Alexander MacGregor, of London, advocates most strongly the use of chinosol in phthisis. He reports its use in one hundred cases, and feels satisfied that he has obtained better results from it than he ever had from creosote or guaiacol. Chinosol is the oxyquinoline sulphate of potassium; it is a powerful germicide, but it does not seem to be much used as an antiseptic. Dr. A. C. Cipriani also reports eight cases treated in the same way. He gave one gramme in twenty-four hours, and he was satisfied that improvement followed its administration.

TREATMENT OF PHTHISIS WITH NITRATE OF SILVER.—Dr. T. J. Mays, in the *Boston Medical and Surgical Journal*, recommends the hypodermic injection of silver nitrate over the course of the vagi in the treatment of pulmonary consumption. From four to seven minims of a two and one-half per cent. solution answered well, though sometimes five minims of a five per cent. solution were required to bring about inflammatory action. The point of injection is immediately over and behind the carotid artery, half-way between the angle of the jaw and the clavicle. A cocaine injection (two and one-half per cent.) should precede the above, for without it the nitrate of silver causes severe pain. The author reports that cough, expectoration, dyspnoea, and depression are all ameliorated, appetite improved, and general strength increased. The physical signs also exhibited a marked change for the better.

YELLOW FEVER.

The subject of yellow fever, always of great interest to the medical profession, especially in the Southern States and all ports which are in direct communication with Cuba and Central America, has attracted particular attention during the past year,—first, because our much closer relations with the yellow-fever districts of the West Indies since the Hispano-American war have increased travel to and from those

regions and the consequent danger of the introduction of the disease into our home ports; secondly, because the strenuous efforts made by our army in Cuba to improve the sanitary condition of the large cities of that country have been followed by prompt and gratifying results; and, thirdly, because we have acquired definite knowledge of the specific micro-organism that causes this disease, and have already introduced in the port of New York and elsewhere a serum treatment based upon that discovery.

Under the improved conditions of sanitation and hygiene introduced into Havana and Santiago, the disease in those two cities, as well as in other parts of Cuba occupied by our troops, has been held in check, and the number of cases reported is with few exceptions less than ever before in the history of the country. A curious illustration of the changed conditions in Havana since the American occupation is shown by the fact that the health authorities there were considering the advisability of declaring a quarantine against Key West, where a severe epidemic raged, while at Vera Cruz and other towns along the Mexican coast the fever continued for many months and was attended with unusual fatality. Advices from Tehuantepec reported that nearly all the foreigners arriving there had been taken down with the fever, the mortality being great. This was the first epidemic of fever in that part of Mexico for fifteen years.

INVESTIGATIONS OF THE MARINE-HOSPITAL SERVICE AT HAVANA.—Upon the establishment of the commission in Havana, it began the investigation of the methods of Sanarelli by repeating the experiments described in his "memoirs," and instituted search for the "*B. icteroides*" in all cases of yellow fever available for study, verifying the results obtained by control studies made upon the cadavers of those dying of this and other known diseases.

Their report consists of a careful bacteriological study, ante-mortem and post-mortem, of twenty-two cases of disease diagnosed as yellow fever by the native physicians in attendance. In twenty of these blood was taken from the tip of the ear, in Sternberg bulbs, and planted. In twelve instances the "*B. icteroides*" was isolated in pure cultures. The *B. coli communis* was present four times. *Bacillus* "X" was isolated from the urine and stools. Case 13 gave also the "*B. icteroides*" from the sputum; case 18 blood gave Widal reaction; while case 21 was seen on the twelfth day of the disease. In cases 2, 19, and 20 there was a question as to the diagnosis of yellow fever. In case 14 "*B. icteroides*" was isolated from a pneumonic process in the lung. Blood from case 22 was kept in the bulb for eight months, when the "*B. icteroides*" and colon bacillus were found to develop. Eliminating

all doubtful cases, we find the "*B. icteroides*" isolated from the blood in 92.85 per cent. of cases studied during life, and in necropsies it was present in 85.7 per cent.

Necropsies.—Case 7 showed the usual lesions of yellow fever. Cultures were made from organs and fluids of the body. The "*B. icteroides*" was present in those from the spleen and heart's blood. Case 9 presented a similar condition, "*B. icteroides*" being present in cultures from blood and spleen. From urine and fæces the "bacillus X" was isolated. Case 11 gave the "*B. icteroides*" from the heart's blood, spleen, and liver, while cultures from the black vomit gave the "bacillus X." In case 14, in addition to the usual lesions, the trachea contained bloody sputum; its mucosa was injected and covered with bloody pus. The condition of the lungs was similar to that found in cases which have died from "grippe." "*B. icteroides*" was isolated from the lung. From the sputum the "bacillus X" and the bacilli of sputum septicæmia were isolated.

Biological Features.—"Form of organism: Fine, slender rods, from one and a half to two microns in length, and three or four times as long as broad. Occur singly or in pairs; short threads from cultures in bouillon, but never in those from solid media. Ends rounded, sometimes almost a cocco-bacillus in shape." Very motile. Flagella present. Stain well with all basic aniline dyes, and are decolorized by Gram's method. Are facultative anaërobes, growing best at 37° C. On inclined agar agar at 37° C. isolated colonies are thin, flat, grayish, circular. In two or three days colonies will present a thick opalescent ring surrounding a flat, thin, transparent area. The original colony is opaque, while the outer border is transparent. Streak cultures resemble those of typhoid. Gelatin does not liquefy. On ten per cent. plates at 16° to 18° C. the deep colonies are perfectly circular, sharp bordered, waxy; later dark, sometimes black; showing, possibly, in centre fine radiating lines. Surface colonies resemble droplets of mucus; thick, convex, circular or kidney-shaped. An opaque yellow-white nucleus is seen at the centre or at the hilum of the kidney-shaped colonies. It is finely granular, sharply bordered, hat-shaped, and in the kidney colonies the crown is turned towards the hilum. Milk is not coagulated. Nitrites and indol are not formed. Gas is produced in glucose bouillon. In bouillon there is seen no pellicle or deposit. An invisible moist growth is noticed on potato. Slight acid production in glucose.

Pathogenesis.—Pathogenic to rabbits, guinea-pigs, mice, dogs, cats, and monkeys. Animals inoculated with virulent cultures of *B. coli communis*, *B. cholerae suis*, *B. "X,"* and the bacillus of Havelberg pre-

sent lesions markedly similar to those produced when "*B. icteroides*" is used, the difference being one of degree and not of kind. In man infection with the colon bacillus from an appendiceal abscess gave lesions indistinguishable from those of yellow fever.

Twelve white mice were fed the "*B. icteroides*," and in two cases a healthy mouse was placed in the cage with an infected animal, and it was found that one of the healthy animals became sick four days after exposure, and died on the tenth day. Of the animals that had been fed the "*B. icteroides*" eleven died, which shows that the "*B. icteroides*" is infectious for mice, but not invariably fatal. At necropsy, in each case, the "*B. icteroides*" was recovered from the animal's body. The duration of the disease was from six to eight days. Mice fed the bacillus coli communis and the "bacillus X" remained healthy. Rats fed with "*B. icteroides*" present a picture more closely resembling that seen in man; the period of incubation is three days, and the course of the disease six to seven days.

Insufflation.—Cultures twenty-four hours old were taken from agar plates and mixed with lycopodium powder and dried at incubating temperature. After twenty-four hours this mixture was with a powder-blower insufflated for three minutes through a small opening into a closed box in which a rabbit and a guinea-pig were confined, and the procedure was repeated on the following day. Results negative. A dog was tracheotomized and a tube inserted. After reaction the animal was given half a cubic centimetre of a bouillon culture of the "*B. icteroides*." Two days later the animal died, and from various organs of its body "*B. icteroides*" was isolated. Half a cubic centimetre of a bouillon culture of "*B. icteroides*" was injected into the trachea of a rabbit; the animal died six days later, and from its body was isolated the "*B. icteroides*." Similar results were obtained on other rabbits.

The trachea of a large ape was insufflated through the larynx for three minutes, upon two consecutive days. Blood from the ear four days later gave the "*B. icteroides*." The animal was ill for several days, but finally recovered. A second ape was insufflated, with negative result, also a small Brazilian monkey. The "*B. icteroides*" is found to be infectious to goats, kine, horses, and the ass.

After further study of a large number of animals, the commission concludes that the infective organism of yellow fever always gains admittance by the respiratory and not by the alimentary tract. "Moreover, we have shown that in rabbits and dogs to which the infection has been conveyed by insufflating the lungs there exists a purely local infection, without any septicæmia, and that the organism can be regained

only from the secretion of the lungs. In these animals the colonization is localized; the systemic invasion is by the toxines alone." Since the disease is at first localized in the lung, examination of the sputum is of diagnostic value before the blood is invaded by the "*B. icteroides*" and in cases where no secondary invasion takes place. "The first invasion of the pulmonary tissue and the ensuing intoxication soon give place to an improvement, which frequently, and in some epidemics almost invariably, is the commencement of convalescence. During the earlier part of this stage the blood is sterile, but its infection takes place about this time, from the second to the fifth day, after which all symptoms become aggravated—by what? By the secondary invasion of the blood by the '*B. icteroides*' from the lungs, the primary seat of the colonization." "There is no evidence that yellow fever is propagated by contamination of the supply of drinking-water." The commission concludes that the "*B. icteroides*" alone is constantly associated with yellow fever, that its presence is sufficient for diagnosis, and that it is never isolated from persons not infected with yellow fever.

Reaction to the Processes of Disinfection.—The thermal death point was found to be 58° C. after three minutes' exposure. Carbolic acid diluted one to twenty and mercuric chloride one to ten thousand were found to be fatal to the organism after exposure for one minute. Pieces of sterilized flannel were saturated with a virulent bouillon culture of the "*B. icteroides*" and dried over sulphuric acid, with negative results. Pieces of flannel prepared as above were placed in a Petri dish and exposed for ten hours to strong sunlight, when it was found that the fabric was sterile. Cold has no injurious effect on the "*B. icteroides*."

Toxines.—These are of the albumose type; soluble in water, insoluble in alcohol and ether; they are precipitated from solution by alcohol and the sulphates of ammonium and magnesium. They combine with the salts of gold and platinum. It is probable that they are alkaloidal in nature, and consist of two substances, one of which is liberated during the organism's growth and is of feeble intensity, while the other is contained in the microbial body and is liberated when its ectosarc is destroyed. This second substance is of the greater intensity. These substances were found to be highly pathogenic for white mice.

The "*B. icteroides*" gives no special reaction with the blood of persons or animals sick with or dead of yellow fever. The report contains notes on the similarity between the "*B. icteroides*" and the "*B. cholerae suis*;" also report of tests made in the use of Professor Sanarelli's anti-amarylic serum as a curative agent in yellow fever.

At the hospital in New Orleans, in 83.33 per cent. of the cases examined the bacillus *icteroides* was found, and the identity of the

bacillus icteroides of our Southern States with that found in Cuba, and that sent to the commission by Professor Sanarelli which was obtained in South America, was established. As a control of these investigations, the commission made use of a number of patients suffering from diseases other than yellow fever, from whom the blood, extracted in the same manner and treated in the same way, failed to yield any organism at all comparable to Sanarelli's.

As a result of these investigations and of numerous experiments on animals, the following conclusions were reached: (1) That the micro-organism discovered by Professor Giuseppe Sanarelli, of the University of Bologna, Italy, and by him named "bacillus icteroides," is the cause of yellow fever. (2) That yellow fever is naturally infectious to certain animals, the degree varying with the species; that in some rodents local infection is very quickly followed by blood infection; and that, while in dogs and rabbits there is no evidence of this subsequent invasion of the blood, monkeys react to the infection in the same way as man. (3) That infection takes place by the respiratory tract, giving rise to the earlier manifestations of the disease. (4) That in many cases of the disease, probably a majority, the primary infection, or colonization in the lungs, is followed by a "secondary infection," or a secondary colonization of this organism in the blood of the patient; this secondary infection may be complicated by the co-instantaneous passage of other organisms into the blood, or this complication may arise during the last hours of life. (5) That there is no evidence to support the theory, advanced by Professor Sanarelli, that this disease is primarily a septicæmia, inasmuch as cases do occur in which the bacillus icteroides cannot be found in the blood or organs in which it might be deposited therefrom. (6) That there exists no causal relationship between the bacillus "X" of Sternberg and this highly infectious disease; and that the bacillus "X" is frequently found in the intestinal contents of normal animals and of man, as well as in the urine and the bronchial secretions. (7) That, so far as the commission is aware, the bacillus icteroides has never been found in any body other than one infected with yellow fever; and that, whatever may be the cultural similarities between this and other micro-organisms, it is characterized by a specificity which is distinctive. (8) That the bacillus icteroides is very susceptible to influences injurious to bacterial life, and that its ready control by the processes of disinfection, chemical and mechanical, is assured. (9) That the bacillus icteroides produces *in vitro*, as well as *in vita*, a toxine of the most marked potency; and that, from our present knowledge, there exists a reasonable probability of the ultimate production of an antiserum more potent than that of Professor Sanarelli.

Treatment.—The first case of yellow fever treated with the serum of Professor Sanarelli in the port of New York, and one of the first in the United States, is of sufficient interest to warrant a somewhat detailed account of it, which we give here in an extract from the report of the case made by Dr. A. H. Doty.¹

Oscar F. Lackey, twenty-five years of age, a civil engineer in the employ of the federal government, arrived in the port of New York on July 6, 1899, suffering with yellow fever. From the report of the early days of the disease made by Dr. Porter, it was seen that this was a typical case of yellow fever, and, as it had not progressed too far, it was decided to make use of the yellow-fever serum. "To this Mr. Lackey's consent was readily obtained, and preparations were carefully made for its introduction. But little literature bearing upon the administration of the serum exists. In Sanarelli's article it is stated that the serum may be given either subcutaneously or intravenously, and that the latter method is more rapid and effective in its action. This investigator recommends that about one hundred cubic centimetres be used, partly in the veins and partly under the skin.

"The serum used in Mr. Lackey's case was prepared under the supervision of Dr. Charles B. Fitzpatrick. Of this ten cubic centimetres injected into a guinea-pig ten hours before inoculation with a fatal dose of a living culture of the bacillus icteroides (Sanarelli) prevented death. However, to cure guinea-pigs previously inoculated with a fatal dose of the living culture a larger dose (fourteen cubic centimetres) was required.

"Accordingly, at 11.30 P.M., July 6th, the first injection, consisting of twenty-five cubic centimetres, was given in the loose cellular tissue on the right side just above the pelvis; at 2.30 A.M., July 7th, a second injection of twenty-five cubic centimetres was administered at the corresponding point on the left side, and at 7.20 A.M. a final injection of fifty cubic centimetres was made; the latter was introduced in the vicinity of the first injection on the right side. The syringe used was similar to those employed in introducing the diphtheria antitoxin, having a capacity of twenty-five cubic centimetres. This was carefully sterilized by boiling. The skin at the site of the puncture was treated with an antiseptic solution, and after the withdrawal of the needle collodion was immediately applied. The operation caused no inconvenience to the patient, and no unpleasant signs nor symptoms, either local or constitutional, followed the use of the serum. The amount of albumen in the urine, thirty-five to forty per cent., remained constant until

¹ N. Y. Med. Rec., August 26, 1899.

July 12th, when it rapidly decreased and disappeared on July 15th. The specific gravity of the urine, which at first was 1.025, gradually diminished. The urine was distinctly acid and contained numerous epithelial casts." The patient's mind was perfectly clear throughout the attack, and there was no apparent restlessness.

"Alimentary tract: considerable irritability of the stomach existed, and some slight vomiting occurred during the 6th, 7th, and 8th of July." "Beside the serum no medicinal agents (excepting whiskey) were employed during the course of the disease. During convalescence a tonic containing strychnine was given." "From ten to twelve ounces of warm salt water were occasionally introduced into the rectum to assist the function of the kidneys. This was retained and evidently had the desired effect. . . .

"The serum is believed to limit the destructive action of the specific organism in the system. However, the age of the patient, his apparently good constitution, the early administration of nourishment and stimulants, with the use of saline solution by the rectum and the most careful watching and nursing, may have contributed largely to the satisfactory termination of the case."

As long ago as 1881, Dr. C. J. Finlay, of Havana, advanced the theory that yellow fever was transmitted through the agency of the mosquito; and since the positive proof, by Dr. Theobald Smith, that Texas fever is transmitted by the cattle-tick, and, by Ross, Manson, and others, that malaria is transmitted by the mosquito, he has again promulgated his theory, with the added weight of eighteen years' experience and observation and the increased knowledge of the habits and life history of the mosquito. He believes that the mosquito may transfer the disease directly from a patient to a healthy individual, without passing through the different stages of its life history, and may infect the next generation, through which man may again become infected.

In a recent issue of the *Medical Record* the same observer says, "After an interval of two or more days, which the mosquitoes require to digest the blood and empty themselves, they are ready to sting the next victim that offers, and may do so as many as ten or twelve times during the thirty or more days that I have been able to keep them alive. It is, therefore, quite admissible that, when the mosquito becomes contaminated, not only its eggs but also its salivary and serum glands may be invaded by the pathogenic germs, so that the latter may be discharged with the secretion of those glands along the track of the wound and into the capillary vessel entered by the sting when the insect attacks its victim. Indeed, on some rare occasions I have seen mosquitoes die within twenty-four hours after they had stung a patient with severe

yellow fever, without assignable cause, for they still retained some of the blood which they had sucked; whence it might be surmised that the yellow-fever germ is pathogenic for the Havana mosquitoes, though the infection seldom proves fatal for those insects. In August (1898), during my stay in the field hospitals on the hills near Santiago, I made an observation which, as far as it went, agreed with my theory about yellow fever, inasmuch as there were neither mosquitoes, mosquito-eggs, nor larvæ to be found in my encampments, and not a single case of yellow fever occurred among the one hundred and fifty men who came under my observation, notwithstanding daily communication with the city."

The following instance is quoted in support of the theory. "In the capital of Mexico, and in other districts of similar altitude above the sea level, Mexicans who never have visited the lowlands have no immunity whatsoever against yellow fever, a sure proof that no epidemics of that disease ever occur in that part of the country. It sometimes happens, however, that a resident of the capital takes the infection by going to Vera Cruz, though the disease may not declare itself until his return to the capital. In such cases the yellow fever will run its usual course, with the same symptoms and prognosis as if the patient had remained at Vera Cruz, with this difference only, that in Vera Cruz other susceptible persons might readily have caught the infection from him, whereas in the City of Mexico the disease is never propagated. If the infection could be transmitted by contact with the patient or his secretions, by inhaling his emanations in the sick-room, or by the use of contaminated food or beverages, there would be no imaginable reason why the disease should not be transmitted at the City of Mexico as well as at Vera Cruz. Such not being the case, we must infer, first, that a factor which is necessary for the transmission of the disease present at Vera Cruz is absent in the City of Mexico; and, second, from the circumstance that the disease is not transmissible through the forms of exposure enumerated above, that the yellow-fever germ is pathogenic only when introduced in a less trivial manner, as by inoculation under the epidermis or directly into a blood-vessel. Hence my theory of the mosquito.

After a careful study of the various kinds of mosquitoes found in yellow-fever districts and their mode of transference from one place to another, he briefly sums up the results of his experiments as follows: "First, reproduction of the disease, in a mild form, within from five to twenty-five days after having applied contaminated mosquitoes to susceptible subjects; second, partial or complete immunity against yellow fever, obtained even when no pathogenic manifestations had followed those inoculations; third, the coincidence that cultures made

with the head and proboscides of contaminated mosquitoes produce the identical micrococcus in tetrads previously discovered by me, in collaboration with Dr. C. Delgado, in the blood and secretions of yellow-fever patients."

GENERAL MEDICAL SUBJECTS.

TYPHOID FEVER.—A large number of the troops now serving in South Africa were inoculated against typhoid fever under the general superintendence of Professor Wright, of Netley, and a comparison of cases of the disease occurring respectively in the inoculated and the uninoculated will be watched with the greatest interest.

Professor Osler's address before the Medical Society of the State of New York on the subject of typhoid fever in the United States ought to be read by all. In it he refers to the fact that American scientific men, and not Sir William Jenner, first distinguished between typhus and typhoid. He shows how effectually sanitary reform has swept away typhus and cholera, how we have learned to fight cholera and diphtheria, and, lastly, that with a clean soil and pure water typhoid fever disappears.

Regarding public sanitation in America he says, "This is a nation of contradictions and paradoxes. A clean people, by whom personal hygiene is carefully cultivated, displays in matters of public sanitation a carelessness which is simply criminal. A sensible people, among whom education is more widely diffused than in any other nation in the world, supinely acquiesces in conditions shameful beyond expression."

With reference to the solution of the problem of typhoid fever he says, "The problem will be solved when, first, every city in the Union has a supply of pure water (including ice) and is properly drained; secondly, when suburban and rural hygiene is systematically organized. The responsibility for the wide-spread prevalence of the disease rests directly upon the wanton carelessness of the people themselves. God's own country, with man's own back yards and the devil's own cesspools, expresses the existing conditions. A threefold duty devolves upon the members of our profession,—first, to preach cleanliness! cleanliness!! cleanliness!!! second, to give a loyal and willing support to the State health officials; and, third, to guard every case of typhoid fever as a centre and possible source of further infection."

In speaking of the treatment of perforation of the bowel in typhoid fever, Dr. Keen says that the most important advance in technique is the substitution of local anæsthesia by cocaine for a general anæsthetic. This was first proposed by Cushing. The perforation, when found, should be sutured without paring, Halsted's mattress suture being used.

Drainage would usually be required, though better results might perhaps ensue from filling the abdominal cavity with salt solution and closing the wound.

According to Platt, the operative treatment of typhoid perforation was first suggested by Leyden in 1884 and first carried out by Lücke in 1885. In January, 1898, Keen collected eighty-three cases with sixteen recoveries. Platt reports three cases with one recovery; these, with seventeen others collected from the literature, added to Keen's cases, make a total of one hundred and three operations with twenty-one recoveries. The advantage of early operation is well illustrated by the following statistics. Of seventeen cases operated on within twelve hours, four, or 23.5 per cent., recovered; of twenty-six cases operated on between twelve and twenty-four hours, nine, or 34.6 per cent., recovered; of fourteen cases operated on between twenty-four and forty-eight hours, one, or 7.1 per cent., recovered; of six cases operated on in two or three days, six, or 33.3 per cent., recovered; of four cases operated on in three or four days, one case operated on after five days, and one case operated on after thirty-five days, none recovered.

Platt advises deferring the operation until the primary shock which usually accompanies perforation, and which, as a rule, lasts for a few hours, has somewhat passed off. The best results have been obtained in cases operated on after an interval of from twelve to twenty-four hours.

DIABETES INSIPIDUS.—Strubell throws a good deal of light on diabetes insipidus by observations on a mild and a severe case of the disease. In both more water was excreted than was ingested. In the milder case the excretion ceased after long abstinence from water, with severe thirst but no general symptoms. In the severe case long-continued lack of excretion was not observed, for the body soon became dangerously depleted and water could not be withheld on account of danger to the heart. In mild cases the absorption and excretion of water follow the same laws as in healthy persons. In health excessive quantities of fluid are excreted by the kidneys, the activity of which is practically unlimited. The insipidus patient excretes much water even without excessive drinking, and so is obliged to drink. It is, therefore, not permissible to speak of the polydipsia as the primary affection. The conclusion was confirmed by the condition of the blood, which rapidly became concentrated when water was withheld, but did not become abnormally dilute even when large quantities were taken. In the mild case there was an increase, while in the severe one, with twenty litres of urine daily, the excretion of nitrogen was normal. Very curious was the fact that sweating in the hot-air bath lessened the feeling of thirst. Neither sweating

nor aseptic fever exercised a beneficial effect, though fever lessened the excretion of urine.

DYSENTERY.—Some confusion has arisen between tropical and amœbic dysentery, which are not necessarily the same. Buchanan reports the results of a large number of cases occurring in India in which post-mortem examinations were held, and there was found but one case of liver abscess. He believes that the colon bacillus and the bacillus pyocyaneus are more often the cause of tropical dysentery than the much-talked-of amœba. On the other hand, Chanowski, who has made many examinations in dysentery, found the amœba either in the fæces or in the tissues, and concluded that none of the colon bacilli produced the characteristic changes in dysentery. The streptococci, associated with some unknown cause, however, apparently play a distinct rôle in the development of the disease.

DIPHTHERIA.—It is now generally recognized by the medical profession that in diphtheria the injection of antitoxin serum gives far better results than any other treatment and lowers the mortality of the disease in a very marked manner. Antitoxin is now extensively employed in all large hospitals, but, judging by the mortality from diphtheria in large towns and centres, it does not appear to be employed by the general practitioner as often as it should be. Ought antitoxin to be injected in every case of diphtheria? Some cases are probably sufficiently mild to recover without it, so that perhaps it is not absolutely essential to inject it in every instance, although it would be excellent practice to do so and the patient would recover much more rapidly. In all cases, however, the patient should have the option of an injection, and injection ought to be insisted upon as early as possible in every case that is at all severe or is likely to prove so. The medical man who loses a large number of his cases and does not employ antitoxin incurs a responsibility which is almost criminal.

SMALLPOX.—The outbreak of smallpox among our troops in the Philippines has been used by the anti-vaccination party as an argument in their favor. This is, of course, not the case, for we are forced to admit that the troops fell victims to the disease simply because they were not sufficiently protected by vaccination. The Army Regulations on the subject are very explicit, and every recruit is immediately vaccinated; but, in the rush and hurry to get the troops to the front, time was not given to ascertain the results of the first vaccination and to revaccinate. When the troops reached the Philippines and smallpox became prevalent, orders were issued to revaccinate; but, unfortunately, the vaccine obtained from San Francisco had deteriorated and was apparently inert. Some was obtained from Japan, and later from the

Board of Health of the city of Manila, which gave better results. The disease was soon brought under control, and but few cases have appeared lately.

GOUT.—Arthur P. Luff has given us a very interesting paper on the modern views as to the causation and treatment of gout, in which he says that, although differences of opinion exist as to whether uric acid is first formed in the liver, in the kidneys, or in other organs or tissues, there is practically no doubt that when first introduced into the blood it exists therein solely as the sodium quadriurate. This compound is an unstable body, and after a variable time, according to the condition of the patient, it changes into the sodium biurate, which, however, is not at once precipitated, since it first assumes the form of the gelatinous biurate, in which form it is a much more soluble compound than the crystalline biurate. This gelatinous modification is afterwards converted, either slowly or rapidly according to various conditions, into the crystalline compound. Therefore, if by any form of treatment the conversion of this gelatinous biurate into the crystalline variety can be delayed, while at the same time its elimination is promoted, we have at our disposal the means of considerably modifying, if not of preventing, a gouty attack.

It is most probable that the gouty paroxysm is due to precipitation of the crystalline sodium biurate in the implicated tissues, where the crystalline deposit acts as an irritant and causes inflammation. In order to start this inflammatory process, it is necessary that the deposition should occur copiously and suddenly. If the deposition takes place very slowly and over a long period of time, then no gouty paroxysm occurs, as is illustrated by those cases of granular kidney disease in which uratic deposits are found post mortem in various joints although no gouty symptoms had ever manifested themselves during life. The results of investigations show that in every gouty patient, whose blood has been examined, the alkalinity of the blood is higher than the average alkalinity of the blood of healthy individuals. In investigating the properties of the gelatinous sodium biurate, the soluble form, which is present in the blood and lymph prior to the gouty attack and from which the almost insoluble crystalline form is derived, he found that by increasing the alkalinity of blood serum with sodium bicarbonate the conversion of the gelatinous into the crystalline form is accelerated. Now, since the increased alkalinity of the blood of gouty patients is due to a higher proportion of sodium carbonate or bicarbonate, it can be understood why such blood is prone to hasten and to augment the formation of gouty deposits. On the other hand, he found that, when the alkalinity of blood serum is increased by the addition of potassium bicar-

bonate, the conversion of the gelatinous biurate into the crystalline form is delayed as regards time and is considerably diminished as regards quantity, thus explaining the well-known beneficial effects of the alkaline potassium salts in the treatment of acute and subacute gout, and also the benefit derived from the free use of green vegetables which are rich in potassium salts.

DIAGNOSTIC VALUE OF GALL-STONE CREPITUS AND FRICTION.—Anders¹ reports three cases showing the significance of a grating sound in cases of suspected cholelithiasis. With the patient in the dorsal decubitus and legs flexed, gentle but deep palpation over the gall-bladder area is made, the finger-tips being pressed into the abdominal wall just below the fundus of the gall-bladder and drawn upward. If this, with counter-pressure by the finger-tips while the patient inspires slowly and deeply, fail, auscultation should be practised. In obscure cases auscultation and palpation are combined, the stethoscope being placed just below the costal arch, to afford space for palpating over the fundus of the enlarged gall-bladder with the finger-pulps of the free hand.

MYXŒDEMA.—Dr. Robert Kirk² reports two cases in which there were acute affections of the skin and mucous membrane of the mouth in the early stage of myxœdema. These cases, he thinks, point to the probability of a thyroiditis and a subsequent atrophy of the gland, producing the usual group of symptoms. He also mentions³ the part that *primula obconica* has been suspected of playing in the causation of these affections. In experiments with the plant he found that it caused a very troublesome inflammation when applied to the skin of a patient suffering from myxœdema, but it produced little if any irritation upon himself.

SPONTANEOUS ESCAPE OF CEREBRO-SPINAL FLUID THROUGH THE NOSE.—Drs. Thomas, Hill, and Halliburton⁴ observed a patient who had a continuous dripping from the nose, which did not yield to treatment. The liquid was collected and found to be cerebro-spinal fluid. The observers believed this to be the first case of the kind recognized, but St. Clair Thomson⁵ calls attention to a spontaneous and unremitting escape of cerebro-spinal fluid from the nose and ears that continued over a period of years and amounted at times to a litre a day, without the manifestation of any untoward symptoms.

¹ Internat. Med. Mag., December, 1899, p. 881.

² Lancet, 1899, vol. i., p. 579.

³ Ibid., vol. i., p. 1630.

⁴ Lancet, 1899, vol. i., p. 577.

⁵ Jour. Amer. Med. Assoc., November 4, 1899.

THERAPEUTICS.

CURE OF TETANUS BY CARBOLIC ACID.—Dr. Woods¹ cites a case of recovery from tetanus after large doses of carbolic acid given hypodermically. He is of the opinion that this mode of treatment of tetanus is far more satisfactory than any serum treatment at present in use. Babes, in the seventeenth volume of the "Twentieth Century Practice of Medicine," speaks of the injection of carbolic acid in tetanus and of its beneficial results in the following words: "Injections of carbolic acid were first recommended by Baccelli, on the strength of a cure obtained in a very grave case of tetanus. . . . Through the marked success of carbolic acid in experiments on animals suffering from tetanus, I was induced to try Baccelli's treatment, which, according to Italian observers, at first furnished good results, but is becoming obsolete, probably on account of the modern specific treatment. I am, nevertheless, constrained to mention it, as it has proved so satisfactory in my hands. As a result of my experience, I feel justified in urgently advising the injection of a carbolic acid solution in all cases in which the tetanus antitoxin cannot be obtained." Babes's method of employment is as follows: a one-half per cent. solution of carbolic acid is injected along the spinal column, beginning at the neck, in doses of from five to ten grammes (f3j-ijss) every two hours.

Ascoli, an Italian, employs the method in a slightly different manner. He injects subcutaneously three or four centigrammes of carbolic acid in the form of a two to three per cent. solution, so that the patient receives thirty-five centigrammes per day. A comparison of this treatment with the serum treatment was made by the Accademia Medica of Rome, with the following result: Baccelli's treatment gave one death in thirty cases; Tizzoni's serum, eight deaths in forty cases; Behring's serum No. 1, four deaths in eleven cases; Behring's serum No. 2, two deaths in nine cases.

Lieutenant-Colonel W. G. H. Henderson reports, in the *London Lancet*, that in India he treated both human beings and horses with carbolic acid, with marked success. Of twenty patients treated with two minims of carbolic acid in twenty minims of water three times a day seven recovered. Kitasato has demonstrated that carbolic acid acts as an anæsthetic, as an antiseptic, and as an antidote to the toxine of tetanus.

Dr. Woods recommends the use of carbolic acid in large and heroic doses, and argues, from the recovery of the case under his care, that

¹ N. Y. Med. Jour., September, 1899.

it is effective only when administered thus, premising, and probably correctly, that if given boldly and as early as possible, so that the system may be quickly and completely saturated, its antiseptic properties will be manifest in the blood. The subject is not yet settled satisfactorily, but, inasmuch as carbolic acid has given such excellent results in the past, it should not be lost sight of, and may stand many in very good stead when at a distance from a place where the serum can be obtained, even should that method of treatment prove to be a specific.

THERAPEUTIC USE OF THE RÖNTGEN RAYS.—The X-ray comes in for its share in the new therapeutics with which we close the nineteenth century, and its application to the various forms of disease is well summed up in an editorial in the *New York Medical Record*, from which we quote the following: "In a recent issue of the *Journal des maladies cutanées*, there is an account, by Drs. Castel and Foveau de Courmelles, of lupus of the cheek benefited by the rays to such a degree as greatly to encourage these observers. Séances of ten minutes three times a week, each extending over a month, were without result; but when currents of greater frequency were employed, an energetic revulsion was noticed and decided improvement took place."

"Albero Schönberg refers to two instances of lupus, one completely cured after eight months by the ray, not exceeding twenty volts five ampères, applied daily for from twenty minutes to half an hour. After twenty days suppuration began, and there was an intermission of the application. The process was then repeated, with intervals to permit healing. In the second case skin reactions occurred after the fifth séance, and after six months there was a cure of visible lesions. The time of cure, it is thought, might be shortened if the use of the rays should be discontinued as soon as skin reaction takes place, instead of being continued until dermatitis has been produced. Kümmell has had no less than ten cases of lupus under X-ray treatment, and regards the latter as a decided advance in the treatment of this obstinate affection. He, too, says the skin should not be burned, and that such severe effects are to be regarded as accidents, necessitating interruption of the application. He is of the opinion that the rays have some peculiar action directly upon the nodules, and that the dermatitis set up plays little or no part in the beneficent process. Whether the effect is due to tropho-neurotic or to electro-chemical action is not clear. It is said that the cicatrices are much less pronounced and objectionable than those produced by the older methods of treatment, and, so far as his observations go, subsequent disfiguring contractions of scar tissue do not occur.

"Passing to the internal or more generalized forms of tuberculosis, instances of improvement and even of cure have been recorded. Among

recent reports is that of Ausset and Bedart, who treated a young girl for chronic tuberculous peritonitis which had been uninfluenced by previous therapeutic attempts. After fifty sittings of half an hour's average duration, the tube being placed at twelve centimetres from the surface of the abdomen, all evidence of the disease vanished.

Turning to the condition of hypertrichosis, numerous reports have been made. Among those in which sufficient time has elapsed to make sure that the hair does not grow again are a number of the forty instances reported by Jutassy, in which after the lapse of a year there had been no return. Schiff and Freund place on record seven cases. They advise that the strength of the current should not exceed two amperes, the time of action ten minutes, and that the source of light be placed at from twenty to twenty-five centimetres from the surface. Upward of thirty sittings are required. The skin is said to undergo a brownish discoloration a few days before the hair falls.

"Thomson, writing in the *American X-Ray Journal* of November last, maintains that the effects upon the skin are produced chiefly by those rays of the X-ray order which are most readily absorbed by the flesh. Such rays are sent out when the vacuum in the tube is too low or when the tube is 'soft,' while a hard tube or one with a high vacuum will give rays that pass freely through the flesh. Dr. C. L. Leonard, writing in the same journal, thinks we should not attribute therapeutic results to the unknown rays which may be explained by the well-known laws of electrical stimulation, nor destructive effects to its devitalizing action. After a somewhat extended experience this observer has arrived at the following conclusions in regard to the matter.

"1. Static electric currents are capable of producing all the therapeutic and destructive changes ascribed to the Röntgen ray.

"2. A static field of sufficient strength is always present when a tube is said to be capable of producing these results.

"3. Why should we ascribe to the Röntgen ray therapeutical and pathological effects which the static changes always present are capable of producing?

"4. It is impossible to produce a 'burn' when a protecting shield of aluminium is employed, which collects the static electricity and conducts it by a grounding wire to the earth, although the Röntgen efficiency of the ray is unaltered.

"5. It is therefore reasonable to conclude that the devitalizing action attributed to the Röntgen ray is due to long-continued or intense static charges or currents, while the therapeutic action is the stimulating effect of a mild and judiciously employed amount of the static charge.

"6. The therapeutic results obtained are of undoubted value, but

the value will be enhanced and its employment facilitated by the recognition of its true physiological source."

The X-ray has been utilized in the treatment of pulmonary tuberculosis. It has recently been demonstrated that by means of skiagraphs, diagnosis of the exact condition of the lung and the progress of the disease can be made several weeks before the same can be ascertained by percussion and auscultation.

Rieder has made some interesting experiments in regard to the influence of the Röntgen rays on infectious processes. The bactericidal action of these rays was first determined by plate cultures, and then mice, rabbits, and guinea-pigs were inoculated with streptococci, staphylococci, and anthrax bacilli. The experiments were absolutely negative. Forty-eight animals were next inoculated with tubercle bacilli. Twenty-six of these were exposed to the rays, while twelve served as controls. From exposures even lasting as long as two hours, it was determined that local tuberculosis was checked, but not cured, by the application of the rays, while a general affection was in many cases made worse. Experiments upon a number of persons suffering from phthisis gave no encouraging results. The reason for this seems to be that the length of time for which a patient can be safely subjected to the rays is not sufficient to obtain therefrom any benefit.

THE TREATMENT OF HEART DISEASE BY INHALATIONS OF CARBONIC ACID GAS.—Dr. W. Ewarts read a paper on this subject before the British Medical Association. His theory is that, as carbonic acid gas acts as an anæsthetic and also as a stimulus to the muscles of respiration, a continued use of the inhalations has the effect of gradually removing dilatation. By the ordinary treatment it is difficult to influence mitral stenosis, but carbonic acid gas always caused improvement and often restored the patient to a condition of comfort. He recommended inhalations of thirty seconds' duration.

TREATMENT OF SARCOMA WITH FORMALIN.—Dr. William Mitchel constantly applied a one and one-half per cent. solution of formalin to an inoperable recurrent sarcoma of the cheek, with the result that hemorrhage ceased entirely. Under this treatment the malignant growth became indurated and was gradually removed with a scalpel until the whole tumor had been obliterated piecemeal. The application being suspended temporarily, a line of demarcation like that in dry gangrene appeared. The advantages of this method are many and apparent, the chief disadvantages being pain and œdema, especially of the glottis, which might prove fatal, and the danger of systemic absorption.

CURE OF DRUG HABITS WITH SODIUM BROMIDE.—Dr. N. MacLeod, of Shanghai, has had excellent results in the cure of morphine, chloral,

and cocaine habits by the use of sodium bromide in large doses. Two drachms of sodium bromide in solution are given every two hours for the first two days and one-drachm doses on the third day. None is given after bedtime on the third day. Three ounces of the drug, in all, will suffice. The sleep induced lasts five or six days and nights, during which time only milk is partaken of. Solid food should be given as soon as it can be taken, and, when locomotion is recovered, exercise should be encouraged. A case will appear well in three weeks, but at least three weeks more should be allowed for convalescence.

CURE OF PURPURA HÆMORRHAGICA WITH ERGOTINE.—Dawson, of London, reports an interesting case of acute purpura hæmorrhagica in which, after all the usual plans of treatment had been tried without success, it occurred to him to do what would be indicated in the case of an adult with severe uterine hemorrhage. He therefore gave a five-minim injection into the left buttock of *injectio ergotinæ hypodermica* (B. P.) ; the hemorrhage stopped almost immediately.

MONSONIA BURKEI.—An extract and tincture of the *Monsonia Burkei* of the South African Karoo, collected and introduced by Dr. John Maberly, has proved of great value, not only in tropical dysentery, of which one hundred consecutive cases treated with the drug are reported by Mr. Maberly, with only one death, but also in hæmorrhagic ulceration of the stomach and intestine.

ERYTHROL TETRANITRATE FOR ARTERIAL TENSION.—Among drugs effecting vaso-dilatation and which have been employed with success in relieving arterial tension, the most useful modern addition has been erythrol tetranitrate, administered preferably in chocolate tablets containing half a grain.

LIGHT IN THE TREATMENT OF LUPUS.—Following up the observed influence of light in checking the growth of bacteria and annulling their destructive effects on living tissues, Dr. Finsen, of Copenhagen, has devised a system for the treatment of diseases of the surface of the body by means of concentrated light rays from the sun or an arc lamp. He eliminates the heat rays at the red end of the spectrum by means of blue-tinted alum solution within a hollow plano-convex lens for sunlight and by the employment of quartz lenses with the electric arc. Three hundred and fifty patients suffering from *lupus vulgaris* have been subjected to this method of treatment with satisfactory results, the affected areas being exposed to the influence of the light rays for a period of from one to three hours at a time daily over a period of some weeks or months. The disease was arrested in all the cases and the cosmetic results were excellent, the treatment being reliable, painless, and superior to other methods in the infrequency of relapse. The

erythematous form was not appreciably improved, but with alopecia areata the results were more promising.

CHRONIC OPIUM POISONING IN AN INFANT.—Boggess¹ reports a case of chronic opium poisoning in a well-nourished infant nine months of age. From the time the child was three months old the mother had been in the habit of giving it from four to twenty drops of laudanum, five or six times a day, for the relief of colic. While under the influence of the drug the child was bright and in good spirits, but after its effects wore off and when it was withheld became fretful. Recovery followed the rather rapid withdrawal of the opiate.

QUININE IN THE TREATMENT OF LEUCORRHOEA.—W. Wright Hardwicke² calls attention to the value of quinine in the treatment of leucorrhœa. In his hands its employment in this disease was uniformly attended by the most satisfactory results. R. Shalders Miller³ endorses the foregoing estimate of the efficacy of quinine in this connection.

LACTIC ACID FOR BALDNESS.—Balzer⁴ rubs the bald part daily with a thirty per cent. solution of lactic acid until the skin becomes inflamed. The treatment is then suspended for a few days, and resumed when the inflammation has subsided. He has often observed a new growth of hair in three weeks.

POTASSIUM PERMANGANATE ENEMATA FOR DYSENTERY.—Dr. Gastinel⁵ finds that potassium permanganate exerts a very favorable influence upon the inflamed and ulcerated mucous membrane in dysentery, acting both as an astringent and as an antiseptic. After cleansing the rectum with warm water, about two ounces of a one-to-two-thousand solution at 113° F. are slowly injected and retained from half a minute to two minutes. The enema causes a dull pain, which soon subsides. It is essential that the patient should keep perfectly quiet for an hour after each injection. For children the strength of the solution may be one to five thousand, and for very young infants one to ten thousand. This treatment is also efficient for proctitis.

TREATMENT OF PNEUMONIA WITH HOT-WATER BAGS.—Dr. Kolipinsky⁶ has successfully treated pneumonia with hot-water bags, and believes that when the disease is recognized early it may be aborted. The bags should hold one gallon each, and, having been covered to pre-

¹ Archives of Pediatrics, May, 1899, p. 358.

² Lancet, 1899, vol. i., p. 26.

³ Ibid., p. 192.

⁴ Semaine médicale, May 19; Fortschritte der Medicin, September 20.

⁵ Archives de Méd. navale, 1899, No. 8; Klinische-therap. Wochenschrift, October 15.

⁶ Maryland Med. Jour., 1899, No. 12, vol. xii., p. 179.

vent burning of the skin, should be placed with their mouths upward, forming a trough in which the patient lies. If hepatization be prevented by this method, internal medication is not necessary and may prove harmful. Seven of his patients were sixty years of age or more, a fact which speaks well for this method.

CHLOROTONE.—This remedy may be obtained by distillation from a mixture of equal weights of chloroform and acetone to which caustic potash is slowly added. E. M. Houghton and T. B. Aldrich¹ have found it to lessen pain in lacerated wounds and to relieve vomiting and pain of gastric origin. Gastric cancer and sea-sickness seem to be promising fields for its use. Dr. J. P. Arnold states that in the dose of two decigrammes per kilogramme of the body-weight it is a most useful and reliable anæsthetic for experimentation on dogs. It is given on the tongue or injected into the jugular direct. Its effects are lasting. The animal can be prepared before demonstration, and does not require any attention from an anæsthetizer, even during a prolonged operation. In ten-grain doses it is said to act beneficially as an hypnotic.

DEATH FROM BURNS RECEIVED WHILE BEING TREATED FOR RHEUMATISM.—A man fifty-five years old died, at a Philadelphia hospital, from burns received while his arm was being treated in a patent machine for curing rheumatism by the application of intense heat. The apparatus consisted of a metal cylinder two feet long and fifteen inches in diameter. The patient's arm was covered with wadding, which caught fire as he withdrew his arm from the "bakery." There were two physicians and a nurse in the room at the time, but they were unable to extinguish the fire until the man's face, arms, and breast had been so severely burned that he soon died.

RESUSCITATION OF ASPHYXIATED PERSONS.—Laborde² continues to call attention to the great benefits to be derived from rhythmical traction of the tongue in cases of asphyxiation from drowning or from illuminating gas. Fourteen cases are reported in which subjects recovered after they had been under water from ten to twenty minutes or overcome by illuminating gas for a long time. The tractions should be persisted in for two or even three hours before all hope of resuscitation is abandoned. An apparatus for the automatic application of this method has been made for life-saving stations.

NEW REMEDY FOR TAPEWORM.—Lauren³ found the anthelmintic property of *aspidium filix-mas* to exist in the roots of some other ferns,

¹ Jour. Amer. Med. Assoc., 1899, vol. xxxiii., p. 777.

² Bull. de l'Acad. de Méd., September 26 and October 3, 1899.

³ Therap. Monats., April, 1899.

and especially of *aspidium spinulosum*, a more common and hence cheaper variety. He made an ethereal extract of the roots of the latter, which he used in several cases with complete success, and without the occurrence of any unpleasant symptoms.

CREDÉ'S SILVER OINTMENT IN SEPSIS.—Jones¹ gives statistics showing that between one hundred and two hundred deaths occur yearly from puerperal sepsis in New York. In addition to other methods of treatment, he calls attention to inunctions with Credé's silver ointment. This is not a salt of silver, but is soluble, uncombined metallic silver made into a fifteen per cent. ointment, three grammes of which contain about four and one-half grains of pure silver. In acute cases this ointment is used once in twenty-four to thirty-six hours and in chronic cases twice daily. It is thoroughly rubbed into the skin and subjacent tissues at some distance from the point of infection. Improvement in the symptoms began within from three to ten hours.

Gustave Schirmer reports nine cases of epidemic cerebrospinal meningitis successfully treated by inunctions of one ounce of unguentum Credé daily for three days, and of one-third ounce at each relapse, with very hot water applications to the spinal column to relieve pain, antiseptic cleansing of the nasal passages as soon as the condition of the patient permitted, and small doses of trional when there was great restlessness.

THERAPEUTIC USE OF THE COLLOIDAL METALS.—Dr. Arthur Schlossmann, of the University of Leipzig,² says that the preparations of silver in a soluble form and of metallic mercury in a colloidal modification seem to offer possibilities of a most exact dosage and a very ready absorption. The colloidal silver preparation, which is entirely new, enables us to obtain the medical properties of the metal itself. The salts only have been previously used, and these have very different actions in accordance with their acid constituents. He believes that silver in its colloidal state is an excellent, non-irritant, and non-poisonous antiseptic, that deserves to be tried not only in surgery, but also in the various fields of internal medicine. No other remedy so quickly and thoroughly cures infectious diseases of the mucous membranes, such as blennorrhœal ophthalmia of the new-born and colicystitis. Colloidal mercury, on account of its minimum toxicity, ready absorbability, and prompt action, is also deserving of general attention. Simple solutions of the pure metals should not be employed, but albumen to the amount of the beaten white of one egg to two hundred cubic centimetres (six

¹ *Obstetrics*, 1899, No. 2.

² *Therapeutische Monatshefte*, May, 1899.

and two-thirds ounces) of the solution should be added, even when the drugs are used in ointments.

THE FUNCTIONS OF THE PHAGOCYTES.—Kobart at Dorpat reported that salts of silver and iron, when used internally, not only pass through the intestinal mucosa by diffusion and get into the blood stream, but that a certain amount of these substances is taken up by the leucocytes in the intestinal wall and carried by them through the system. Metschnikoff has confirmed these observations, especially regarding the absorption and distribution of the salts of mercury. This function is found to belong especially to the polynuclear and mononuclear leucocytes, the cells of mesodermic origin which enclose and destroy microbes.¹

THERAPEUTIC USES OF LIQUID AIR.—Dr. A. Campbell Hoyt has been testing the value of liquid air in medicine and surgery. As a local anæsthetic in minor surgery it has proved most successful, preventing pain and hemorrhage and leaving a clean non-suppurating wound. He states that we have no other agent at our disposal which will so quickly, so thoroughly, and with so little pain clear up the edges and stimulate the surface of an ulcer to granulation. The liquid air is applied intermittently; the whole field of operation is never frozen at one time. In the abortive treatment of boils, carbuncles, buboes, etc., it is without an equal, absolutely no sloughing following its use. It has been applied with most satisfactory results in herpes zoster and sciatica. In lupus erythematosus after two treatments the affected areas entirely desquamated, leaving the derma in a perfectly healthy condition, slightly red, with no eschar and no evidence of any tendency to recur. It has been tried in epithelioma and carcinoma, but, although glowing accounts have been given, it is still too early to make predictions.

MEDICAL MORPHINOMANIACS.—T. D. Crothers believes morphinism among physicians to be alarmingly prevalent, estimating that ten per cent. of all medical men use morphine. His statement has elicited a general expression of disagreement from other members of the profession.

THERAPEUTIC NOTES.—S. S. Cohen recommends the use of five drops of a three per cent. solution of palladium chloride three times a day, well diluted with water, for the first and second stages of tuberculosis. The dose can be gradually increased. The physiological action is supposed to be similar to that of the platinum salt.

The use of aluminium chloride in doses of five grains and upward repeated three times a day has proved remarkably efficacious in locomotor ataxia.

¹ Med. News, 1899, vol. lxxiv., p. 146.

Grant recommends cinnamon as an internal antiseptic in malaria, typhus fever, and influenza.

Friend ¹ used oxygen with good results in a case of slow asphyxiation by illuminating gas.

SERTHERAPY.

The chief interest in therapeutics during the year seems to have centred about the experiments and investigations in serum-therapy. It is yet too soon to predict the extent to which this treatment will develop, but, from the various lines on which investigators are working, it seems probable, if they are successful, that the whole field of medicine will eventually become involved, and that our *materia medica* will in future consist largely of antitoxins with the methods of their preparation and administration. Diphtheria, tetanus, septicæmia, embracing erysipelas and puerperal fever, pneumonia, yellow fever, snake-bite, leprosy, plague, cholera, and anthrax are already on the list, and before another year has passed we shall probably have many more to add.

TABLE INDICATING THE ACTION OF VARIOUS SERA.—Sir Richard Douglas Powell, in an address delivered before the annual meeting of the British Medical Association held at Portsmouth on August 2, 1899, presented the annexed table, indicating the actions of various sera in therapeutics. (See page 242.)

PUERPERAL FEVER TREATED WITH ANTISTREPTOCOCCUS SERUM.—C. T. B. Maisey reports a cure of puerperal septicæmia with antistreptococcus serum. The first injection was of sixteen cubic centimetres, and a few hours afterwards the patient stated that she felt much better. Delirious symptoms, which followed a second injection given two days later, were afterwards proved to have been caused by a reinfection from the nurse.

TETANUS ANTITOXIN.—Dr. E. Tafel ² states that subcutaneous injection gives temporary immunity, which lasts from four to six weeks and may be prolonged by repeated injections. It should be employed when the character of the injury or the opportunity for infection suggests danger. As it is useful only against tetanus infection, ordinary aseptic measures should not be neglected. The amount required is two

¹ Brit. Med. Jour., May 13, 1899.

² Correspondenz-Blatt f. Schweizer Aerzte, 1899, No. 8, p. 235

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	Bactericidal.	Antitoxic.	Prophylactic.	References.
Diphtheria	<i>Nil.</i>	Strongly.*	Decidedly (similar to tetanus).	Behring, Cobbett and Kanthack, Clinical Society, Sims Woodhead, American Pediatric Society.
Tetanus	<i>Nil.</i>	To circulating poison, that which is as yet unfixed by the tissues. More promising in early and less acute cases. Cerebral or subdural injection preferred.	Prophylactic for tissues as yet not attacked.	Roux and Borrel, Köhler.
Septicæmiæ† (streptococcal and allied affections, erysipelas, puerperal fever, etc.).	Doubtful.	Decidedly.	Decidedly.	Bulloch, Mitchell Bruce, Commission American Gynecological Society, Petruschky.
Pneumonia	Probably not.	Decidedly (experimentally).	Decidedly (experimentally).	Pane, Eyre and Washbourn, Mennes.
Yellow fever	Encouraging results.	<i>Nil.</i>	Decidedly.	Sanarelli.
Snake poison	?	Antitoxic.	Prophylactic.	Calmette and Delarde.
Leprosy	?	? (probably not).	?	Atherstone and Black, Herman and Abraham, Palakowski.
Botulismus (meat poisoning)	. . . . .	Antitoxic.	Prophylactic.	Van Ermenger, Kempner.
‡ Plague . . . . .	. . . . .	? Slight.	Decidedly.	Haffkin, Clemow.
‡ Cholera	Yes.	Not.	Decidedly.	Haffkin.
Anthrax	Yes.	Not.	Decidedly.	Haffkin.

* Paralytic affections are apparently increased by the use of antitoxin, a greater number of lives being preserved to the period when paralysis occurs.
 † The "streptococcal infections" are difficult to differentiate and are frequently manifold, so that for the present each case is more or less experimental and must be judged on its own merits until we can push diagnosis to exact variety of organism or organisms involved.
 ‡ In plague and cholera the treatment is rather a vaccination than a serum treatment.

drachms, and this may be repeated after an interval of a week. Where tetanus is fully established, this treatment will be successful only when the amount of toxins is not much more than the usual fatal amount. If this is much greater and the incubation is short and the symptoms severe, the treatment by injection will not avail, because of the impossibility of injecting a sufficient quantity of the remedy. On the other hand, in intracerebral injections a smaller quantity will suffice, as the serum is brought more directly into contact with the toxins held in the brain-substance and can rapidly neutralize them. The amount necessary when used in this way is about one drachm, which may be repeated as often as is necessary. To neutralize the toxin which is circulating in the remaining portions of the body, from one and a half to three ounces of serum may be administered by intravenous injection. This is especially important if the tetanus bacilli or their toxins are still found in the wound. If intravenous injection is not practicable, subcutaneous injection in thigh, abdomen, chest, or arm may be substituted.

THE THERAPEUTIC VALUE OF MARMOREK'S SERUM.—Dr. William L. Baum¹ draws these conclusions: (1) In pure streptococcic infections the serum undoubtedly exercises a favorable influence on the course of the disease. (2) In mixed infections the influence of the serum was demonstrable, but it merits further trial as an adjunct to other treatment. (3) In view of the grave character of complications of non-streptococcic nature reported, ordinary rules of therapy would demand that in such cases, as with diphtheria antitoxin, all indicated therapeutic measures should be employed, as well as the serum. (4) As erysipelas streptococci and phagocytes often exist together in the lymph-channels, it is fair to assume that the serum acts as a bactericide on the streptococci, and not entirely through stimulation of phagocytic action. (5) The initial dose in all cases should be five drachms, to be followed by one-half or two-thirds of this quantity, according to the indications, every twenty-four hours.

CALMETTE'S ANTIVENENE.—The value of Calmette's antivenene has been established. A dose of from ten to twenty cubic centimetres, or in an extreme case of forty cubic centimetres, administered by intravenous injection, if given from one to three hours after snake-bite, should suffice to prevent death.

ANTISTREPTOCOCCUS SERUM IN THE TREATMENT OF ULCERATIVE ENDOCARDITIS.—As antistreptococcic serum is still on trial, the following case, reported by Rogers, may be fully recorded without prejudice,

¹ *Medicine*, 1899, vol. v., p. 23.

and may help to define its value as a remedial agent. By itself it may be of little value, but, taken in conjunction with others already reported and with others still to appear, it may be useful. Though recoveries from ulcerative endocarditis have been recorded, it is almost universally fatal, so that any agent which will counteract the toxine would be most acceptable. The chief difficulty lies in the fact that we have to deal with a disease in which the infection may be caused by several distinct micro-organisms or a group of organisms, while the symptoms appear the same in every case. It is only by a cultivation from the blood drawn directly from a vein that the nature of the infection can be established. As yet we have a serum to counteract the toxine of streptococci only, and it is doubtful whether it will cure every case of streptococcus infection. It appears that in order to get favorable results from anti-streptococcus serum we must be sure of three facts,—first, that there is endocarditis; second, that the endocarditis is infective; and, third, that the infection is due to streptococci. How often the infection is due to streptococci is unknown, but one observer found it so in about one-third of the cases he examined, and we cannot help feeling that as yet the good effect of the serum in these cases has to be proved. No doubt to cure endocarditis, or even to relieve it, is a severe test to which to put it.

ANTITYPHOID INOCULATIONS.¹—It is important to record the results already obtained from antityphoid inoculations, both to add to the stock of knowledge respecting it and, if possible, to encourage its further trial, in the hope of securing a certain degree of prophylaxis against the invasion of enteric fever.

Primary Inoculation.—On October 23d a man, aged twenty-four, about to proceed on tropical service, submitted to a primary inoculation with antityphoid serum supplied in sealed glass capsules by Professor Wright, of Netley. The patient was confined to bed and had a pad of lint soaked in mercuric perchloride solution applied overnight to the left flank. Dr. Garret injected the first dose, about one cubic centimetre, at 9.30 A.M., the temperature being below normal (97.6° F.) and the pulse 80. The site of puncture was closed by sterilized plaster. Some pricking pain and throbbing ensued at the point; slight pain was also felt in the left thigh and around the left ilium. In two hours there was a copious flow of pale urine and the temperature had risen to 99.4° F. There was slight left temporal headache, the skin was generally injected and moist, and after a short sleep the patient woke in a profuse perspiration. At 4.30 P.M. the temperature was 100° F., the pulse 95. The pain continued in the left flank; it was felt also in the

¹ Sir Dyce Duckworth, in Brit. Med. Jour., November 18, 1899.

axilla and down the leg of the same side. At 6.30 P.M. a patch of vivid redness two inches square was apparent around the point of injection, with streaks proceeding from it in various directions, as of cellulitis, the sensibility of the patch being much heightened. Pulse 76. Appetite was impaired until evening, and there was considerable thirst. At 9.45 P.M. the temperature was 99.8° F. and the pulse 80. On scoring the red patch with the finger-nail, white streaks were readily produced. On October 24th, after a good night's rest, the redness was as before, and the patient had a bruised sensation in the flank. At 9 A.M. the temperature was normal. There had been one loose motion. Appetite was good. The urine was normal, though dark in appearance and less in amount than usual, specific gravity 1026, alkaline reaction. About noon the temperature was 99.6° F., but fell in the evening to 99.2° F. On October 25th the patient was feeling quite well. The temperature was 97.4° F. The patient rose, had a bath, and went out in the forenoon. The bruised sensation in the side continued four days longer.

Second Inoculation.—This was made in the left flank but a little lower down, the same amount of vaccine being used. On November 2d at 9 A.M. the temperature was 99° F. There was less pain after the injection. In two hours a large amount of pale urine was discharged, and there was some sweating during the forenoon. At 12.15 P.M. the temperature was 100.8° F., at 3 P.M. 99.2°, and at 7 P.M. 98.6° F. The pulse during the day was 80, bounding, and of moderate tension. The patient felt very poorly for half an hour about 2 P.M. In the evening a fresh patch of redness appeared at the site of inoculation. Appetite was diminished, but there was less thirst than after the first injection. The patient passed a good night. On November 3d the redness persisted and was spreading around towards the loin. An enlarged gland had appeared in the left groin and was distinctly tender. A loose motion was passed. The urine was diminished in amount and darker in color than usual. Ehrlich's reaction was not obtained in it. The patient was feeling quite well and went out in the afternoon. On November 9th an examination of the finger blood was made for Widal's reaction by Dr. Andrews, in the pathological laboratory of St. Bartholomew's Hospital. The reaction was extremely vigorous even in a two-hundred-fold dilution.

An inoculation with another portion of the same vaccine was made in a second patient. Very similar symptoms followed and there was some discomfort for three or four days; the pain in the flank, though not severe, occasioned the most urgent of the slight inconveniences experienced. A second inoculation ten or twelve days after the first is highly desirable, to secure the full benefit of the serum.

In this practice perfect asepsis and sterilization of all instruments employed are essential. The patient should remain in bed for two days and keep quiet till all reaction has passed. With these precautions, in healthy subjects, there appears to be no cause for anxiety as to a satisfactory result. The subject would do well to have his blood-serum tested by Widal's process at intervals of from three to six months for some years afterwards.

ANTISTREPTOCOCCUS SERUM FOR SMALLPOX.—Lindsay¹ thinks that the fatal ending in smallpox is largely due to a pyæmia resulting from the secondary infection of the pocks by pus organisms, especially the streptococcus pyogenes aureus. For this reason he injected aseptically the antistreptococcus serum of the Jenner Institute in six severe cases, and, as four recovered, he feels satisfied that much benefit was derived from its employment.

HOG CHOLERA.—In the report of the Department of Agriculture to the Fifty-sixth Congress, it is stated that the third year of experiments with hog cholera shows that from seventy to eighty-five per cent. of the animals treated with the protective serum are saved.²

INJECTIONS IN DIABETIC COMA.—Drs. Roget and Balway³ mention several solutions, differing but little in composition, for hypodermatic use in diabetic coma. They personally prefer a seven per cent. solution of sodium chloride, but are of the opinion that the particular salt used is of less moment than is generally supposed. The object of the injection is to promote the elimination of the poison. If the renal functions are not normal, relief is but temporary. All the patients who recovered had sound kidneys. The injection increases glandular activity, and by transudation through the intestinal mucous membrane causes a diarrhœa which aids in the removal of toxic material from the tissues.

ENZYMES AS REMEDIES IN INFECTIOUS DISEASE.⁴—It has been surmised, by Nencki and by Pfeiffer, that the substances leading to recovery from infectious diseases and producing immunity from them belong to the enzymes. The latter author believed that these enzymes are prepared by the animal organs and not by the bacteria themselves. From cultures of the hog-cholera germ an enzyme has been obtained which renders guinea-pigs insusceptible to that disease; this enzyme exhibited poisonous action in doses but little larger than those necessary for immunizing. It has been proved that the bacillus pyocyaneus

¹ Brit. Med. Jour., 1899, No. 2002, p. 1144.

² Independent, December 7, 1899.

³ Lyon Méd., 1899, vol. xc., p. 188.

⁴ Science, March 10, 1899.

produces enzymes which dissolve not only the bacilli themselves, but also other microbes, such as the germs of cholera, typhoid fever, anthrax, diphtheria, black plague, staphylococci, and probably gonococci. The micrococcus prodigiosus and micrococcus erysipclatis produce bacteriolytic enzymes, but the organisms of black plague and tuberculosis evidently do not. The enzyme produced by the bacillus pyocyaneus can, by combination with an animal protein, be transformed into an immunizing substance.

EXTRACT OF SUPRARENAL GLAND AS A HÆMOSTATIC.—Lermite¹ says that the vaso-constrictor and hæmostatic action of the extract of the suprarenal glands has repeatedly been demonstrated in ocular and nasal surgery and in the treatment of skin diseases. A case of persistent epistaxis in his own practice seems to suggest another valuable practical use to which it may be applied. The patient, aged six years, after a severe attack of diphtheria four years before, had suffered from epistaxis, having on an average three or four hemorrhages weekly. Various forms of constitutional but no local treatment had been used, without beneficial effect. The nasal mucous membrane showed a dilated and angiomatous condition of the blood-vessels. Lermite inserted into each nostril a pledget of cotton-wool soaked in a five per cent. solution of cocaine, followed by similar pledgets soaked in a saturated solution of boric acid containing five grains of dried extract of suprarenal gland to the ounce. Each pledget was left in the nostril five minutes. These applications were made on alternate days for three weeks, then on every third day for three weeks longer, afterwards on every fourth day until twenty-four applications had been made. This treatment produced ischæmia of the nasal mucous membrane, stopped the bleeding at once, and resulted in permanent cure.

ANTIDIPH THERITIC SERUM IN THE TREATMENT OF WHOOPING-COUGH.—V. Gilbert,² having observed improvement in pertussis upon the administration of the antidiphtheritic serum for diphtheria in a case in which these two diseases were present at the same time, made a trial of this preparation in whooping-cough. It lessened the frequency and severity of the paroxysms and exerted a favorable influence upon the complications.

TREATMENT OF OBESITY WITH THYROID EXTRACT.—Ebstein³ refers to the popularity of this treatment in England, and repeats the warning given by the manufacturers against the indiscriminate use of the thyroid

¹ Brit. Med. Jour., February 25, 1899.

² Revue méd. de la Suisse Romande, June 20, 1899, p. 373.

³ Deutsche med. Woch., 1899, Nos. 1 and 2.

tablets by the laity. When the administration of this preparation is not supervised by a physician, the possibility of thyroidism and other dangers is considerable. Despite the excellent results claimed for it by Leichtenstern and Wendelstadt, Ebstein declares strongly against the use of thyroid extract in the treatment of obesity. In seven cases in which it was employed in the clinic at Göttingen there was a slight reduction in body weight, but not more than could have been obtained by proper dieting. He thus states his objections to the employment of the remedy in this connection. 1. Its action is uncertain and irregular. Loss of weight often ceases during its administration or shortly after its discontinuance, and may not occur at all. It causes no improvement in the patient's subjective feelings. 2. The treatment is not rational. The ideal treatment aims to remove fat only. The use of the thyroid extract is attended by loss of body albumen also, as studies in metabolism have shown. 3. The same results may be obtained without any risk to the patient by proper regulation of the diet.

NEUROLOGY.

A case of cerebral meningitis is reported from Little Rock in which the remarkably high temperatures of 114°, 116°, and 118° F. were recorded during a period of ten days.

LOCALIZATION OF INTRACRANIAL TUMORS.—In an article appearing in the spring number of *Brain*, Byrom Bramwell makes the following statement: "Speaking generally, I may say that as my experience of intracranial tumors increases I become more and more cautious in drawing conclusions from the clinical data as to the position of the new growth. I have met with cases in which an intracranial tumor was situated in every one of the parts of the cerebrum which are specially included in this discussion, and in the cerebellum, in which there were absolutely no localizing symptoms indicative of the position of the tumor. I make one exception only, for when the occipital lobe is the seat of the tumor (*i.e.*, when the half-vision centre or the optic radiations of Gratiolet are implicated by the tumor) hemianopsia is probably always present; but I speak tentatively on this point, as I have seen very few tumors of the occipital lobe. In two cases in which the tumor involved the temporosphenoidal lobe there were, practically speaking, no localizing symptoms, and I have been in the habit of regarding the temporosphenoidal lobe as *par excellence* the silent area of the brain."

He regards (1) tumors at the base of the brain as the most likely to produce localizing symptoms. Next in order are those (2) of the pons Varolii and medulla oblongata; (3) of the centrum ovale; (4) of the occipital lobe, involving the half-vision centre or the optic radiations of Gratiolet; (5) of the motor area, in which location tumors produce irritation and give rise to localized epileptiform convulsions; (6) of the cerebellum; (7) of the frontal lobe; (8) of the upper part of the parietal lobe (*i.e.*, tumors which do not involve the angular gyrus or the white matter underlying it); and (9) tumors of the temporosphenoidal lobe, especially those situated on the right side. He reports a number of cases which confirm his views on the localization of intracranial tumors.

A FORM OF TERMINATION IN THE CENTRAL NERVOUS SYSTEM.—Turner and Hunter, by means of subcutaneous injections of a saturated solution of methylene blue, come to the following conclusions. First, that in the majority of cases a cellulipetal fibre may be traced to and found to break up over the cell body and base of the protoplasmic processes; in no case has the cellulipetal fibre been found to break up previous to reaching the cell body; second, that this lattice-work is more clearly defined over that portion of the cell—namely, the root of the axis-cylinder process—which is deficient in the so-called Nissel bodies; third, that it is also clearly seen over cells whose general staining is faint; fourth, that, when the cell is rendered indistinct by changes in the focus, the lattice-work is thrown into clearer perspective; fifth, that, as best seen in the nucleus of the trapezium, the ending may be apparent without the cell.

ON THE MEANING OF THE CRANIAL NERVES.—W. H. Gaskell, in the presidential address before the Neurological Society, after a very exhaustive discussion concludes that the cranial segmental nerves represent the original type of segmental nerves, and are all derived from the corresponding segmental nerves of the anthropod. The spinal type is a more recent type, and, like the spinal cord, is a vertebrate characteristic. "One great reason why I feel that my theory is based on true lines and will ultimately be accepted is because it is in harmony with what is, to my mind, the great leading conception underlying the whole evolutionary process,—that an upward progress in the animal world is correlated with a steady growth of the central nervous system, especially of the foremost part of it, or brain."

CASE OF STRÜMPELL'S PARALYSIS, OR POLIOENCEPHALITIS, COMBINED WITH INFANTILE PARALYSIS.—In this case, reported by Williams, of Bristol, the lesion was double and involved the neuron of both the upper and lower motor segments. The patient was a girl aged eleven, who had been paralyzed for six years. The mother stated that the girl

came home from school complaining of severe pain in the head over the left temporal region. She had a convulsion, after which her face was drawn to the left side, and there was loss of speech with paralysis of the right arm and leg. The facial paralysis gradually disappeared, and the power of speech returned in about fourteen months from the onset of the disease. The child at the time of the seizure was in apparently good health, and there was no history of infection or of rheumatism or chorea. There were no signs of congenital syphilis. She attended school, but learned very slowly and was very forgetful. On admission to the Bristol Hospital for Sick Children, her right arm was found to be in a spastic condition, with the elbow and wrist more or less flexed and the fingers flexed or extended and rigid, all movements being slow, incomplete, and usually tremulous. The right arm measured a quarter of an inch more than the left, the increase probably being due to the constant choreiform movements. The electrical reactions were normal. The heart and lungs were normal. The right leg measured one inch less than the left. There was pes cavus, for which tenotomy was performed. In 1898 at the Bristol General Hospital the electrical reactions of the flexors seemed normal, but the peronei gave the reaction of degeneration. Knee-jerks were present. It was evident that the lesion was one of the upper motor segment. The grounds on which the conclusion was based were, first, that the lesion was a hemiplegia; second, that speech and the facial muscles were affected at the onset; third, that there was no reaction of degeneration in the upper limb; and, fourth, that the reflexes were not lost. That the whole process was not due to this cause alone was evident from the fact that the leg had wasted and the reaction of degeneration could be obtained in some of the muscles. It was, therefore, certain that the lesion was double,—namely, that there was a lower segment lesion, anterior poliomyelitis, as well as an upper segment lesion, which might be an associated polioencephalitis. The disease was attributed to insanitary surroundings.

HEREDITARY MOTOR PARALYSIS.—John K. Mitchell¹ gives a very interesting account of a periodic general motor paralysis, including the whole body except the head, in several generations of the same family. He is of the opinion that the paralysis is produced by the action of a poison, formed in the body, upon the heart and vessels, the spinal centres, and the peripheral nerves and muscles.

TETANY CHECKED BY PYLORECTOMY FOR CANCER.—Albu² reports the case of a man, aged thirty-four years, ill for six months with vomit-

¹ Amer. Jour. Med. Sci., vol. cxviii., p. 613.

² Arch. f. Verdauungskrankheiten, 1899.

ing, severe pains in the epigastrium, and emaciation. Examination showed dilatation of the stomach, with decomposition of ingesta; neither lactic nor hydrochloric acid; no sarcinæ; no long bacilli. No tumor could be made out. The diagnosis of cancer of the pylorus was made, probably by the further course of the symptoms, which grew worse in spite of treatment. Lactic acid was present at times. One morning the patient had a sudden attack of tetany, though incomplete, inasmuch as Trousseau's and the facial phenomena were absent. Operation disclosed, as a cause of the dilatation, a small piece of scirrhus of the pylorus, which was resected. All evidence of tetany then disappeared and recovery followed. At the end of four months the patient had gained twenty-seven pounds. After the second month the motor power of the stomach was normal and the dilatation had disappeared. Lactic acid was not found again nor was the secretion of hydrochloric acid restored. Albu believes this case to be a strong proof of the toxic origin of tetany, and that when it complicates gastric cancer an operation is more strongly indicated than in simple cancer, because tetany is more dangerous to life than cancer. He condemns gastroenterostomy, with or without pylorotomy, as less likely to secure good results than resection with union of the two ends.

GIANT FORM OF ACROMEGALY.—William N. Lackey¹ reports a remarkable case in a negro twenty-eight years of age. The patient has a reach of eight feet and nine inches; his hands are eleven inches in length and his feet thirteen inches. His height is eight feet and six inches, two inches greater than that of any case which the writer found reported.

SYPHILIS AS A CAUSE OF TABES DORSALIS.—Guttmann² discusses the conflicting views regarding the part played by syphilis in tabes dorsalis. Statistics show that, while syphilis is a factor in a certain proportion of the cases, it is not, as has been thought by many, the cause in the large majority. Guttmann shows that researches in the anatomy and pathology of the disease are just as conclusive against as for the syphilitic theory. Senator agrees with the Leyden school, but is of the opinion that syphilis may be a predisposing factor in the causation of tabes.

KERNIG'S SIGN IN MENINGEAL HEMORRHAGE.—In 1884 Kernig described a phenomenon which he thought was found only in affections of the pia mater and always in inflammations of it. When the patient is recumbent the legs can be easily extended on the thighs, but when he sits up extension is rendered impossible by contracture of the flexor muscles. After having attracted but little notice during fourteen years

¹ Phila. Med. Jour., July 22, 1899.

² Zeitschr. f. klin. Med., vol. xxxv., p. 242.

Kernig's sign has recently received considerable attention and has been found to be of great value in the diagnosis of meningeal diseases. In the main Kernig's conclusions have been confirmed; the sign appears to be present in about eighty or ninety per cent. of cases of meningitis. At the meeting of the Société Médicale des Hôpitaux on December 1, 1899, MM. Fernand Widal and Prosper Merklen called attention to the occurrence of Kernig's sign in cases of meningeal hemorrhage and to its diagnostic value. Cases of meningeal hemorrhage in which the sign has been observed are rare, though such have been recorded by Kernig himself. MM. Widal and Merklen related the case of a healthy man, aged thirty-two years, who while writing in his office without any premonitory symptoms fell from his chair unconscious. He regained consciousness in some hours without having shown any change in temperature, paralysis, or contracture. He complained only of intense headache affecting the whole head and then of pain in the back. Movements of the trunk were difficult and painful. The pupils were slightly dilated, the eyes were suffused with tears, and the face was congested. There was neither albuminuria nor glycosuria. When the patient was recumbent the legs were extended on the thighs, but when he sat on the edge of the bed the legs became flexed in contracture and could not be extended. He remained in this state for four days. On the fifth day the temperature rose to 100.4° F. and there was slight contracture of the neck; on the sixth and seventh days the temperature oscillated between 100.4° and 101.8° F. Kernig's sign persisted and the headache and backache were intense. On the ninth day death occurred suddenly from syncope. At the necropsy a clot was found beneath the arachnoid membrane extending as far forward as the optic nerves; it was prolonged on the anterior surface of the pons, medulla, and cord as far as could be seen through the foramen magnum. The spinal canal was full of liquid blood. The posterior and superior region of the cord was congested. The posterior spinal artery was dilated and was full of little disseminated clots. This was the only lesion of the central nervous system found after the most minute examination. The mechanism of the meningeal hemorrhage escaped observation. Probably syphilis (which the patient had contracted seven years previously) played a part. In this case but for Kernig's sign a meningeal lesion would not have been suspected. No doubt irritation of the meninges by the clot is the cause of the phenomenon.¹

A CASE OF BRAIN TUMOR AT THE BASE OF THE SECOND LEFT FRONTAL CONVOLUTION.—H. C. Gordiner² claims that this is the only

¹ Lancet, January 6, 1900.

² Amer. Jour. Med. Sci., vol. cxvii., p. 526.

case of the kind on record, and that it proves the existence of a distinct centre for writing, just as there is one for speech. This centre is located at the base of the second left frontal convolution for those who are right-handed, there probably being a centre of like character in a corresponding location in the opposite cerebral hemisphere for the left-handed. The destruction of this centre causes pure motor agraphia unattended by paralysis of the arm. The existence of such a centre was regarded as probable by Exner and his followers, and was supposed by them to be situated in close proximity to the motor speech centre, at the base of the second left frontal convolution. In several cases of motor aphasia combined with agraphia, the autopsy has revealed disease of both the second and third frontal convolutions.

The patient, a female, thirty-seven years of age, had been married fifteen years. Five children living, one miscarriage at the third month. Family history fairly good. Patient's health had always been excellent up to the onset of present illness, about Christmas, 1897. At this time she noticed failure of strength, and had several attacks of vertigo, but did not fall. Dizziness was not attended by nausea or vomiting. Shortly after these attacks frontal and occipital headache, sometimes followed by vomiting, developed, and continued with increasing severity until the fatal issue. In March, 1898, vision became impaired, and glasses were required for near work. About the same time a feeling of numbness was experienced in the right arm. She had no convulsions, unilateral or general. Bowels somewhat constipated. Had perfect control over bladder. Menstruation normal. Conversed fluently and intelligently. Memory for past and present events excellent. No difficulty in the articulate expression of thought. All objects were recognized and named when seen or when placed in her right hand when her eyes were closed. Words and numbers recognized, named, or repeated correctly. Could read numbers or words aloud or to herself, whether written or printed. Could not, however, write voluntarily or from dictation, or copy a single letter or figure correctly. Pen was held properly, but all efforts to write resulted in a series of united curves. There was no paralysis of muscles of arm, forearm, or hand, and all muscular movements of the right hand, both coarse and fine, were properly executed.

Though there was no history or manifestation of syphilis, mercury and iodide of potassium were administered for six weeks, but, no improvement following, their use was discontinued May 20th. No sensory or motor symptoms had developed. There was no hemianopsia nor alexia. Cerebration, however, which at first had been prompt, had now become sluggish, but slowness of speech was in no way aphasic. Questions were answered correctly but with deliberation. The only other

change in the symptoms noted at the first examination was a tendency to fall or stagger to the right side, that had existed for about three weeks. This resembled the incoördination present in cerebellar disease and was similar to that frequently observed in disease of the prefrontal lobe. The development of slow cerebation and ataxia subsequent to the aggraphia, coupled with double optic neuritis and severe and continuous headache unaccompanied by alexia, led to the diagnosis of a new growth, probably situated at the base of the second frontal convolution of the left side.

An exploratory opening was made in the skull by the trephine, July 19, 1898. The cortical area exposed appeared normal. The following day the right side was found to be paralyzed, unconsciousness rapidly followed, and death supervened July 21st.

The autopsy was performed on July 22d, and the paper reports in full the finding in this remarkable case of a brain tumor situated at the base of the second left frontal convolution.

SURGERY.

MR. J. E. FRAZER advises that in uniting two pieces of gut one of them should be rotated on its long axis so that the two mesenteric borders shall not coincide exactly, as a result of this the non-peritoneal triangular space at the mesenteric attachment of each portion of bowel comes in contact with a part covered with peritoneum and firm union rapidly occurs.

The surgical treatment of ascites, as now practised in England, consists in draining the peritoneal cavity and then attaching the omentum by sutures to the parietal peritoneum; vascular adhesions form, by which the portal blood finds its way into the systemic circulation. It would be premature to express any opinion on the ultimate value of this operation, but it certainly promises well in special cases.

A remarkable case of implantation of a human ovary for the relief of symptoms accompanying artificially induced menopause, with complete success, is recorded, and experiments on rabbits indicate that such a procedure may be followed by pregnancy.

TREATMENT OF GUNSHOT WOUNDS OF THE ABDOMEN.—While gunshot wounds are to the civil surgeon a subject of great interest, their importance to the military surgeon can hardly be overrated. In both branches of practice the diagnosis rests on the appreciation of similar symptoms, but the treatment is often different. In civil practice there

is no dread of interfering with the serous membrane. In military surgery the tardy adoption of modern surgical methods in the treatment of gunshot wounds of the abdomen is not because their value is questioned, but because of the difficulties that beset their application in the field.

Colonel Stevenson, professor of military surgery at Netley, regards penetrating wounds of the abdomen treated by the expectant plan (*i.e.*, by rest and opium) as probably the most fatal class of injuries. In the Crimean war 92.9 per cent. of such cases resulted fatally; in the Spanish-American war ninety per cent. He is of the opinion that in reality not more than one per cent. of the wounded recovered, and that the difference between the apparent and the actual mortality is due to the fact that in eight or nine per cent. of the cases penetration had not taken place. He believes that a bullet traversing the abdomen will cause either extravasation of intestinal contents or hemorrhage, or both, and that the issue in either case is fatal.

The indication as to treatment is clear. The abdomen should be opened, the intestines sutured, all bleeding points secured, and the peritoneum closed. Since about 1885 this subject has been actively investigated. Mere exploratory laparotomy has been shown to present a very small mortality, and, as it is futile to expect the viscera to escape injury when a projectile has entered the abdomen, laparotomy should always be performed. He referred to Marion Sims's suggestions on this subject. About fifteen per cent. of the wounds received in battle are abdominal, and these in the majority of cases cause death on the field, usually from hemorrhage. Hemorrhage in the abdominal cavity is often very profuse and seldom stops spontaneously. It can be controlled by laparotomy. Wounds of the intestine are seldom simple; a bullet generally punches out a piece of gut equal in area to the bullet's cross-section, and, as a rule, the intestine is wounded in more than one place. In such cases he thinks it a waste of time to consider the possibility of no ill results: prompt laparotomy is imperative. Injuries to solid organs, such as the spleen or kidneys, generally necessitate their removal to prevent death from hemorrhage. When the diagnosis is once made, he thinks the laparotomy should be performed at once, every half-hour lessening the patient's chance for recovery, the only excuse for delay in military surgery being the overcrowding of the field hospitals or the absence of requisite antiseptics. The mortality in those operated on within twelve hours after receipt of the injury is fifty-three per cent.; during the next twelve hours it rises to seventy-seven per cent.

Contusions of the abdomen, such as are caused by a fragment of a shell, or in civil practice by buffer accidents, are often accompanied by

rupture of blood-vessels, of solid organs, or of the intestinal tube, and may demand laparotomy. The course to be followed in these cases is determined by the symptoms alone. The three primary symptoms are shock, vomiting, and pain. But their severity must not be taken as a measure of the extent of the injury. The diagnosis must be based on their presence, persistence, progress, and duration. The point that decides the differential diagnosis between contusion with and contusion without rupture is the increase or decrease in the severity of the symptoms. If due to contusion only, they diminish; if internal injury is present, they become aggravated. The order of frequency in which the viscera are wounded is liver, spleen, kidneys, stomach, small intestine, and large intestine. Tympanites as a symptom of perforation of the intestine with escape of gas into the peritoneal cavity he considers of no certain value.

For the treatment of symptoms he recommends compression of the abdominal walls for shock, teaspoonful doses of hot water for thirst, and administration of opium for the relief of pain if excessive. He thinks the use of opium should be avoided as much as possible, as it masks the symptoms and obscures the diagnosis. If it has to be given, one-third of a grain of morphine, subcutaneously, is preferable to opium by the mouth. The speaker said that Colonel Senn, of the United States Army, urged early operation, but only when distinct evidence of visceral lesion was present. To assist diagnosis Colonel Senn inflated the intestine, under anæsthesia, with hydrogen gas, a pressure of two and one-half pounds per square inch being used if needful. If perforation were present, the gas escaped by the abdominal wound. In the war of 1870-71 the mortality from perforation under the expectant treatment was ninety-eight per cent. Wounds of the large intestine were not so fatal as those of the small, possibly because of their being in part extraperitoneal. Immediate operation gave the best results. After twelve hours' delay the chances are against recovery, and in from twenty-four to forty-eight hours the case becomes hopeless. Profound shock and collapse, unless due to hemorrhage, may be considered as contraindications. When the patient has rallied from the primary shock, the wound should be examined, being enlarged slightly if necessary, to determine whether penetration has occurred. Only the finger (no instrument) should be used. If penetration has taken place, the abdomen should be opened, all effused blood removed, and bleeding points secured. Wounds of the intestinal tract should next be sought for, it being remembered that the more nearly the bullet has traversed the abdomen from side to side the greater the number of perforations probable. As a fatal result might follow overlooking a single perforation, the examination must be as com-

plete as possible. Each perforation should be sutured by Lembert's method or resected as soon as found. Resection is called for when the loss of substance has diminished the calibre of the tube by one-third, when there are several perforations close together, and when the mesenteric edge is implicated. Suturing when simple must be done at right angles to the long axis of the gut, to prevent constriction. Fine China silk previously boiled makes the best suture for the serous coat and thin catgut for the mucosa. Milhiser's round needle with a somewhat blunt point is the most satisfactory. Ten Lembert stitches should be allowed to the inch. For circular enterorrhaphy the Czerny-Lembert suture should be employed, using catgut for the first and China silk for the second line.

The major operations on the intestines in these cases are nearly always excisions of portions of the tube or end-to-end anastomoses. The object to be secured is a wa er-tight seam, quick of application. In direct methods, such as Maunsell's, the additional incision required is an objection. Of indirect methods he thought highly of Murphy's button, on account of the facility with which it can be introduced. Its use requires practice and experience, however, or too much sloughing might result. The abdomen should be well flushed with sterile fluid at 105° F. and drained for from twenty-four to forty-eight hours with Keith's tubes or capillary gauze drains.

The results of laparotomy for gunshot wounds in the last three wars were not encouraging, but, considering the conditions under which they were performed and the mortality if the cases were let alone, they were not contraindications. In the Spanish-American war all laparotomies were unsuccessful; in the Græco-Turkish war one case of hemorrhage resulted in recovery and one with wound of the hollow viscera died. In the Afridi campaign five cases were operated on, and all resulted fatally.

THE WOUNDS INFLICTED BY DIFFERENT BULLETS.—Dr. Arthur Keith and Mr. Hugh Rigby¹ discuss the effects upon the wounded of the Mark II., the Mauser, the Dumdum, and the Mark IV. bullets, and the relative amount of destruction caused by each of these modern projectiles. The experiments upon which the writers' views are founded confirm fully the experiences which have already been reported from the seat of war in South Africa. The illustrations show the terrible havoc wrought by the Mark IV. and Dumdum bullets, and show also that the old Martini-Henry bullet made an enormous and jagged wound compared with the neat little track that is left by the Mark II., which the British forces are using in South Africa, or by the Mauser, which is

¹ Lancet, December 2, 1899.

being used by the Boers. If the Boers are using Dumdum bullets, as has been reported, it is certain that they will inflict painful as well as mortal injuries, and render the wounded unfit for military service for a long time, if not permanently. At the same time the experiments of Dr. Keith and Mr. Rigby with Dumdum bullets do not confirm Professor von Brun's statement of the case against the English open-nosed bullet. All open-nosed bullets cause fearful injuries, but Professor von Brun must have used Dumdum bullets of an exceptional form to get the results which he recorded.

GUNSHOT WOUND OF THE HEAD.—Barritt¹ reports a curious case of gunshot wound of the head in a boy aged fifteen years. By the premature discharge of a gun which he was loading, the rough iron ramrod, thirty inches long and five-eighths of an inch thick at the bulbous end, was driven through his head, entering the skull above the eyebrow and emerging at the vault. After the accident the boy walked two hundred yards, carrying his gun. He could not speak and did not use his right arm properly. Though comatose when brought to the hospital, he could be roused, and answered questions sluggishly but rationally. He had a punctured wound about the size of a sixpence just above the middle of the left eyebrow and a slightly larger wound over the centre of the left parietal eminence. He fully recovered the use of his right arm and was mentally sound.

NEW METHOD OF CLOSING THE PERITONEAL CAVITY.—O'Hara² gives the following method of treatment for the peritoneal opening. The length of the incision into the peritoneum should never exceed four or five inches. If more room is necessary, it is stretched. The operation over, a purse-string suture of kangaroo tendon is passed entirely around the peritoneal opening, beginning at its middle. This being drawn up and tied, the peritoneal cavity is completely closed against leakage from without, and no raw surface is left within to form adhesions with intestinal coils; the peritoneum also is in a better condition to withstand post-operative vomiting.

A NEW RADICAL OPERATION FOR INGUINAL HERNIA WITHOUT BURIED SUTURES.—Jonnesco³ describes a method which he has devised for obviating the employment of buried sutures in radical operations for hernia in the inguinal canal. It differs from similar operations in the method of inserting the sutures and in the disposition of

¹ Lancet, 1899, vol. i., p. 18.

² Brit. Med. Jour., June 10, 1899.

³ Centralb. f. Chir., 1899, No. 3.

the stump of the sac, which is brought into the wound and forms a part of the scar that unites the muscular plane which overlies the canal. Double silver sutures are placed in layers. They are U-shaped, the two ends being brought out through the skin in the lower side of the wound and fastened over rolls of sterile gauze, the doubled portion being on the opposite side of the wound, in the lower layer in the internal oblique muscle and in the upper in the aponeurosis of the external oblique. In some cases superficial skin sutures are employed; in others they are not essential. The stitches are removed on the fourteenth or fifteenth day. The author has been successful in the seventeen cases in which he has employed this method, and believes that the doing away with buried sutures is a distinct advance in the technique of radical operations.

THE EXCISION OF HEMORRHOIDS.—Reinbach¹ has studied the comparative results of excision and other methods as employed in Mikulicz's clinic. He finds the excision method to be almost ideal: the entire pathological area is removed and a rapid healing by primary union is secured, with a linear scar. The patient is, in fact, returned to a normal condition. The von Langenbeck operation has been followed by good results, except in four cases, where other intercurrent conditions have decreased its efficiency; in one case a relapse was certainly present. The excision method is most warmly recommended, and the author hopes that it may be generally adopted.

ON THE SURGICAL TREATMENT OF HEMORRHAGE FROM GASTRIC ULCERS.—Andrews and Eisendrath² discuss this subject from its historical and clinical aspects, and report two successful clinical interventions, in addition to experimental work, which lead them to the following conclusions: (1) The result of the practice of the best modern surgeons warrants the statement, previously made on theoretical grounds, that operative interference alone can save the lives of patients affected with bleeding ulcers of the stomach, who are not benefited by internal medicine. (2) Surgical intervention is to be recommended, first, in small, repeated hemorrhages; secondly, in severe ones that occur more than once, especially if exceeding five hundred cubic centimetres in amount. (3) A single copious hemorrhage is not necessarily an indication for operation. (4) In ulcers at or near the pylorus, pyloroplasty (Heineke, Mikulicz) is ideal. It makes local treatment possible, gives all the benefits of gastro-enterostomy, and is safer. (5) Cauterization and curetting of the ulcer should give place to resection whenever

¹ Beiträge zur klin. Chir., 1899, vol. xxiii., No. 3.

² Annals of Surgery, October, 1899.

the stomach wall can be reached from without. (6) If adherent posteriorly and at the end of the stomach, cauterization, curettement, and ligature *en masse* are the best substitutes for excision. (7) Ligature *en masse*, except when supported by external sutures, is shown by their experiments to be attended by danger of perforation.

THE SURGICAL TREATMENT OF PERFORATION OF THE BOWEL IN TYPHOID FEVER.—Dr. W. W. Keen, in a paper read at the meeting of the New York State Medical Association, October 25, summarizes his views on the operative treatment of typhoid perforation, as follows:

1. The surgeon should be called in consultation the moment that any abdominal symptoms indicative of possible perforation are observed.

2. If it be possible to determine the existence of the pre-perforative stage, exploratory operation should be done under cocaine-anæsthesia before perforation, shock, and sepsis have occurred.

3. After perforation has occurred, operation should be done at the earliest possible moment, provided,

4. That we wait till the primary shock, if any may be present, has subsided.

5. In a case of suspected but doubtful perforation, a small exploratory opening should be made under cocaine to determine the existence of a perforation, and, if hospital facilities for a blood-count and for immediate bacteriological observation exist, their aid should be invoked.

6. The operation should be done quickly, but thoroughly, and in accordance with the technique already indicated.

7. The profession at large must be aroused to the possibility of a cure in nearly, if not quite, one-third of the cases of perforation, provided surgical aid is invoked.

RADIOGRAPHY IN THE DIAGNOSIS OF FRACTURES.—In an article in the *Practitioner* Edmund Owen makes some valuable practical suggestions on the early treatment of fractures. Inconvenient illuminations of badly set fractures and of other cases in which, to put it mildly, nature has not been enabled to triumph over osseous lesions, are becoming, he thinks, of almost daily occurrence, and the sooner every surgeon realizes this the better for his future peace of mind. A mistake in the diagnosis of a soft swelling or stricture may not greatly matter, as the question will probably right itself in due course, but if we come to grief over a broken or displaced bone or epiphysis, it may be too late to remedy the mistake when the discovery is made. Possibly it is some lay friend of the patient, or it may be some other medical man, who takes the case to the radiographer; but the exact condi-

tion is at last manifested and our mistake is nailed upon the barn-door. There are several ways in which the practitioner may seek security in the treatment of fractures and of injured joints and epiphyses. In the first place, he must examine every case of suspected or of possible fracture with very great care, getting a *confrère* to administer an anæsthetic, if necessary, in order that he may make his inspection absolutely complete. If he is in doubt about any injury, if he is not sure as to the line of treatment that had best be adopted, or if he wishes to relieve himself of some of the inevitable responsibility, he should certainly get some other practitioner to see the case with him. If there is still doubt, he should propose that the help of a radiographer be sought. This is surely better than that the possibly dissatisfied patient should report to him later, and perhaps surreptitiously. Nothing must be overlooked for the new light to make manifest later.

SEPARATION OF THE LOWER EPIPHYSES OF THE FEMUR.—T. Hutchinson, Jun., and Harold L. Barnard¹ speak of the difficulty of reduction in such cases, of the unsatisfactory results often obtained, and of the high mortality when the lesion is compound. They recommend "full flexion" when reduction is attempted. This is said to make the operation easy and to secure perfect motion.

THE GIBNEY TREATMENT OF SPRAINED ANKLE.—Dr. J. Howe Adams² describes the method as follows: Ordinary adhesive plaster is cut into strips one-half inch wide and in two lengths, about twelve and eighteen inches long. As soon as the diagnosis is made, one of the longer strips is placed around the ankle, parallel to the sole of the foot, beginning in front of the big toe, carrying the strip around the ankle just above the contour of the sole and bringing the end back across the top of the foot to about the point where the strip began. It is well to place, overlapping this initial strip, a parallel piece. In placing these strips care should be taken to draw them as tightly as possible, so that the bandage will fit snugly when finished. Having applied these strips, a shorter strip should be placed at right angles to them,—i.e., parallel to the back of the leg. Beginning well behind and above the ankle, this strip should be carried down around the sole of the foot and brought up on the other side of the leg, making, as it were, a stirrup for the foot. The same precaution of applying the strip as closely as possible should be observed. Now the stirrups should be applied alternately, first one around the ankle parallel to the sole, then one parallel to the

¹ Lancet, 1899, vol. i., p. 1275.

² The Railway Surgeon, January 10, 1899.

back of the leg, each one overlapping the one previously applied, running in the same direction, to some extent. This procedure should be kept up until the entire foot is enclosed in a boot of adhesive plaster, having the appearance of a shoe in which part of the heel has been cut away. This dressing, properly applied, has a very neat appearance.

INJURIES OF THE HEART.—Wehr has studied experimentally the technique of operations on the heart, and as a result proposes the following method. An incision commences on the right border of the sternum, just above the fourth rib, and passes transversely across to above the cartilage of the fourth rib on the left side. The incision is then curved across the fourth, fifth, and sixth costal cartilages and sweeps inward transversely through the seventh, resecting the xiphoid at its base. The costal cartilages are to be resected in an oblique direction, so that the plane of the incision intersects the oblique cartilage nearer to the sternum internally than it does externally. After the cartilages have been resected and the sternum has been sawed through without injury to the mediastinal periosteum, the whole—skin, muscle, and bone flap—is turned back gradually, while the costal pleura is carefully dissected free from it. When this is accomplished, the flap is turned clear back, breaking the costal cartilages on the right side. In resecting the ribs a button-pointed bistoury should be used, to avoid injury to the internal mammary artery.

THE REMOVAL OF THE GASSERIAN GANGLION.—Coelho¹ reviews the literature of this subject, and comes to the following conclusions, based upon the work of others and his own results. 1. The ablation of the Gasserian ganglion should be the last resort in the treatment of trigeminal neuralgias, as it is a dangerous intervention on account of the liability to injury of the internal carotid. The injury of the cavernous sinus and of the middle meningeal, although not so dangerous, since injury to them can be recovered from, weakens the individual and retards the operation. Cerebral compression, shock, and secondary infection are the causes of death. 2. The extirpation of the ganglion should be executed by tearing away the trigeminal at the protuberance, if recurrence is to be avoided, for thus only can we be certain that the entire ganglion has been removed; this cannot be assured in isolated removal of the ganglion.

THE OPERATIVE TREATMENT OF EPILEPSY.—Schar,² as the result of his study of the literature of this subject and of his observations of the cases occurring in Koch's clinic, comes to the following conclusions.

¹ Rev. de Chir., 1899, No. 5.

² Archiv f. klin. Chir., 1899, vol. lix., No. 3.

Operation is to be undertaken in cases of epilepsy whenever internal dietetic treatment has failed to produce results in a short time. The slight mortality from such operations makes the danger inconsiderable. It is better to operate too often than too seldom. The surgeon who treats a case of traumatic epilepsy by internal medication for a long period, and resorts to operation only when he finds he cannot produce a cure by other means, does not do his best for the patient. Epileptic patients should be examined by the surgeon as well as the physician at an early period. It is best for them to make the examination together. In asylums the surgeon should from time to time examine the cases and determine which require immediate operation. The surgeon should not forget, however, that internal medication and dietetic treatment are of great value, and that without them, even after operation, the patient could not recover. Alcohol must be avoided and special care given to the diet of the children who have suffered from traumatism. Epilepsy due to traumatism can be greatly benefited by operation at the site of the trauma.

SUBCLAVIAN ANEURISM.—Allingham¹ has brought to notice a method for the relief of aneurism of the subclavian artery. The artery was ligated in its first portion, and the aneurism was removed five and one-half weeks later. The ligation was not followed by hemorrhage, and the aneurism by hardening became better defined, which rendered its successful removal easier.

EMPHYEMA.—Resection of the ribs in empyema is said by West, Tousey Andrews, and others to be too frequently performed before other methods of drainage have been thoroughly tried.

A METHOD OF TREATMENT FOR THE RESTORATION OF ENTIRE TIBIÆ NECROTIC FROM ACUTE OSTEOMYELITIS.—Cushing² reports a case in which he was able to restore the entire tibia after an acute osteomyelitis. His method is as follows:

The indications are to save the patient's life and relieve pain by immediate operation to establish free drainage. The medullary cavity should be opened, pressure relieved, and infection checked. If the bone is dead, as it usually is in a few days, it should be removed. The most favorable time for its removal is when the periosteum and granulation tissue are in their most active generative stages, but before the process of calcification of the bone trabeculæ has enclosed the sequestrum in a compact, dense shell of involucrum. This stage can be determined by frequent examinations of sections of the periosteum with the micro-

¹ Lancet, 1899, vol. i., p. 1487.

² Annals of Surgery, October, 1899.

scope. It is shown by the presence of numerous fibroblasts, osteoblasts, and small trabeculae in which lime-salts are beginning to be deposited. Clinically, it can be recognized by a slight crackling sensation as the periosteum is incised, due, probably, to the crushing of the trabeculae by the knife. The periosteum at this stage resembles granulation tissue in color, density, and vascularity. There is no macroscopic appearance of ossification. Bone will be formed from this elastic, flexible periosteal layer.

This stage was in this case probably reached in the seventh or eighth week of the disease. This is the proper time to remove the necrotic bone by incising the periosteum in the long axis of the leg and shelling out the sequestrum. The periosteal sheath remaining should be closed by sutures, leaving a solid cord or mass of periosteum buried in the centre of the leg, at the most favorable period of its bone-producing activity. If areas of calcification of considerable extent or thickness are found adherent to the inner surface of the periosteal sheath, they should be dissected off. The superjacent soft parts and skin may be closed by suture. The utmost care should be used to render the operation aseptic, for primary union is important. The new bone is formed rapidly, apparently in from eighteen to twenty-four days, when the operation is done at the time above indicated. At this time ossification is so advanced that the new bone is rigid. If the operation is done too early, the periosteum is injured, apparently, and its growth interfered with. If too late, a rigid, bony involucrum makes the removal of the sequestrum more troublesome and forms a cavity which is very difficult to close. The radiograph shows that the medullary cavity is re-formed in the new bone. The shaft of the bone is easier to restore than the epiphysis.

A DEVICE FOR WASHING OUT THE PELVIS OF THE KIDNEY THROUGH THE URETER.—By an ingenious combination of instruments already in every armamentarium, Tuckerman¹ has been able to irrigate the pelvis of the kidney and the ureters. His device "consists of a No. 6 French catheter, an ounce bulb, and the common exploring aspirator, with an ordinary three-way stop-cock, all connected by rubber tubing. The catheter is introduced in the ordinary manner through a Kelly speculum. It is necessary to use a stylet in the catheter, which is passed up as far as possible without force; the stylet is then withdrawn a couple of inches, the catheter passed further, and so on, until the pelvis of the kidney is reached; then, by exhausting, the contents of the pelvis of the kidney can be drawn into the bulb and inspected. If pus be

¹ Clev. Med. Gaz., June, 1899.

present and it be deemed advisable to wash out the kidney, the bulb may be detached from the catheter, filled with boric-acid solution or other disinfecting fluid, and, by reconnecting and reversing the stop-cock, the solution can be injected into the pelvis of the kidney, again withdrawn, new fluid injected and withdrawn, until it comes away clear. Then, if it be desirable to medicate the pelvis of the kidney, the bulb can be refilled with the proper quantity of medicament, which in its turn is forced into the pelvis of the kidney, where it is left by the withdrawal of the catheter."

GONORRHOEA.—From recent observations of the gonococcus, it has been pretty conclusively proved that the infection may not be simply nor always a local process. It is usually accompanied by more or less toxæmia. It may invade by contiguity the entire sexual and urinary systems and the peritoneum. Carried by the blood it may establish secondary infection of all serous membranes, tendon-sheaths, periosteum, skin, muscle, iris, and retina. It is then always possible that the local infection may give rise to either septicæmia or pyæmia, both of which conditions have been designated by the clinical term "gonorrhœal rheumatism." The diagnosis of true gonorrhœa (gonococcus infection) is, therefore, a most important and not always a simple matter. It is not synonymous with purulent urethritis, since the latter may be produced by inoculations of toxins from the vagina, by infection with bacteria other than the gonococcus, by syphilis, and by aggravation of a chronic gonorrhœa without gleet. For clinical purposes we may be satisfied with the symptoms of severe urethritis and with the presence in the pus-cells of diplococci decolorized by the Gram method. But in cases where critical diagnosis is important, we must at least secure the additional proof of cultures.

RELATIVE VALUE OF CASTRATION, VASECTOMY, AND BOTTINI'S OPERATION.—These three are purely tentative measures. In none of them does the surgeon know the contour or composition of the impediment to urination. In none can he predict, even at its close, the effect of his operation on this impediment. In none can he assert the absence of encysted calculi. The objections to castration are loss of testicles, general anæsthesia, and the mortality of from eight to ten per cent.; to vasectomy, the uncertain and transient nature of its effects; to Bottini's operation, the mortality, from seven to nine per cent., and the danger of acute sepsis of the urinary tract and of hemorrhage.

URETERO-INTESTINAL ANASTOMOSIS.—Several new cases of uretero-intestinal anastomosis have appeared; one of these was successfully performed by Nové-Josserand¹ in a case of exstrophy of the bladder.

¹ Revue mensuelle des Maladies de l'Enfance.

Only three out of eighteen cases collected by him died, the danger of pyelonephritis having been diminished since Maydl, in 1894, suggested the fixing of the trigonum vesicæ in the intestine. Incontinence was noted in two cases; the others could retain their urine on an average from three to four hours.

TUMORS AT THE BASE OF THE BLADDER.—Verhoogen¹ reports the case of a child six and one-half years old from whom he removed by suprapubic cystotomy a myxoma of the size of a lemon. The bladder was distended and reached to the umbilicus. There was a slight cystitis due to catheterization. The pedicle of the tumor sprang from the base of the bladder, and sent a prolongation into the prostatic portion of the urethra, which it had dilated so much that the index-finger could be inserted after its removal. The same author also reported a case in which a large tumor occupied the cavity of Retzius in a man thirty-five years old who for three months had had a large swelling in the lower abdomen. The tumor was hard, immobile, rounded, and extended almost to the umbilicus. There were no vesical symptoms save a slight cystitis. In the right groin there was a small fistula that had persisted after an operation for radical cure for hernia.

TUBERCULOSIS IN AN ARTIFICIAL ANUS.—Aldred Scott Warthin* reports a case of tuberculosis of an artificial anus. A man of sixty-seven years had double inguinal hernia, which was easily reduced. Symptoms of intestinal obstruction soon followed, but an operation was declined until they became alarming. Colotomy with production of artificial anus was performed. A good recovery followed in a month. Three months later he began having normal passages by the rectum. He then returned to the hospital, and the artificial anus was closed by resection of the colon. Ulceration set in after the wound had healed nicely. This grew better and patient was discharged. He died about two years later,—it was said from “gangrene.” As tubercle bacilli were found in the parts removed at the time of resection, the writer thinks that the original obstruction was due to tuberculosis of the intestine, causing stenosis, and that the artificial anus became infected from the fæces.

THE RECONSTRUCTION OF THE ANAL SPHINCTER.—Lennander³ resected the anal sphincter in a case in which it had been destroyed by phlegmonous ulceration which left the patient without the power to retain either flatus or fæces, even when astringents and opiates were

¹ Ann. de la Soc. Belge de Chir., 1899, No. 8.

² Med. News, 1899, vol. lxxiv., p. 551.

³ Centralb. f. Chir., June 24, 1899.

employed. Electrical stimulation failed to reveal any contractility of the anal sphincter. Local anæsthesia in the surrounding area and in the mucous lining of the gut made it highly probable that the nerves as well as the muscle had been destroyed. Finding no similar cases reported in literature, he constructed a new sphincter from the levator ani muscles, which have contractile power similar to that of the anal sphincter. The operation was successful, the patient being able to retain flatus and liquid fæces.

PRECAUTIONS IN ANÆSTHESIA.—Dr. W. T. McCardie¹ advises the turning of the head to one side during anæsthesia; the use of a small quantity of ether, given with exact regulation by an inhaler, in preference to a large quantity given by a more open method, which results in greater chilling, irritating, and depressing effects on the air-passages; cleansing of the nasopharynx, nasal passages, mouth, and throat previous to etherization in some cases; and the importance of coughs and colds as contraindications. During a laparotomy a hot-water chamber beneath and long hot-water bottles at the sides of the patient will greatly lessen the danger. In the treatment of ether-pneumonia morphine and atropine are recommended, but the former drug must be given with great care; alkalies and expectorants are of service for loosening secretions and stimulating excretion; otherwise the treatment is the same as for ordinary pneumonia. Commenting upon the rate of mortality from ether pneumonia given in this paper,—nearly fifty per cent.,—R. W. Wilcox² avers that, if the death-rate is anywhere near as great as stated, ether should never be administered to subjects already affected by respiratory or renal diseases. His experience in this form of pneumonia also seems to show that morphine and atropine are absolutely contraindicated and that alkalies and expectorants are of but little use. When death has occurred, which has been in much less than half the ratio quoted, it was caused by right-hearted paralysis. The remedies which he prefers are nitroglycerin and strychnine, the dose to be adjusted to the necessity of the patient. Ether pneumonia is a medical and not a surgical disease, and requires prompt treatment.

DELAYED SUTURING IN PACKED WOUNDS.—Köppen³ calls attention to the fact that it is not good surgery to place stitches in the flaps of a wound which it is necessary to pack with gauze. There are many reasons why this should not be done. If we are so uncertain of our asepsis as to make it necessary to pack the wound, there is no logic in

¹ Treatment, 1899, No. 22, p. 697.

² Amer. Jour. Med. Sci., October, 1899.

³ Centralb. f. Chir., July 1, 1899.

putting in sutures while the wound is septic. These may become infected and lead to stitch-abscesses after the gauze packing has been removed and the wound closed; they will frequently become weakened, while the surrounding tissues may become the seat of a phlegmonous infiltration. The sutures can be readily inserted at a later period by the use of eucaïne *B* solution,—eucaïne *B* 0.1, salt 0.8, water 100. This solution anæsthetizes the part sufficiently to permit the insertion of the sutures and the removal with a curette of the granulations that have formed, so that a more nearly primary union will be the result.

A NEW ABSORBABLE LIGATURE MATERIAL.—Sneguireff¹ reports his experience with a new ligature and suture material which is absorbed more slowly than catgut and can be perfectly sterilized. It is made by dividing the ligamentum nuchæ of the reindeer in the direction of its fibres. The ligature was used in eighty-three major operations, and was found to be absolutely sterile and to be absorbed as soon as desirable.

ASEPTIC SURGERY IN GERMANY.—J. Preston Miller, after a careful study of the methods and technique of the most prominent German surgeons, gives an idea of their peculiarities in operation, many of which would make some of our modern antiseptic surgeons hold up their hands in horror, and yet their results cannot be gainsaid. For instance, Martin operates very quickly, and depends more upon the speed with which he closes his wounds than upon strict modern asepsis, from ten to fifteen minutes being the average time the abdominal cavity is open. He sews up the abdomen with one long suture, as if continuous, but his assistant follows with scissors, cutting proper lengths for tying, without delay to the operator.

Leopold, of Dresden, does not fulfil the requirements of modern asepsis except in washing the patient and the hands of the operator. Cotton wool and gauze are not even sterilized, though used in cleansing and dressing surgical wounds. In eighteen months more than fifteen hundred operations were performed by the above method, without surgical sepsis, silver salts alone being relied on and applied to wound, gauze, and suture. In the laboratory Credé developed the fact that pyogenic germs cannot live near pure unminted silver. From this metal he made citrates and lactates, and found them still more potent germicides, differing from other chemicals of this class in being harmless to man. Commercially the drugs are called “itrol” and “actol.” Kümmel, of Hamburg, uses chloroform almost exclusively; Loretin has replaced iodoform. Chromicized catgut is tabooed. The operator threads his own needle. The catgut is prepared by immersion in a

¹ Centralb. f. Chir., June 17, 1899.

four per cent. formalin solution for twenty-four hours; it is then boiled one-half hour and placed in alcohol, where it remains until used. The operators wear rubber boots, linen overalls, short-sleeved undershirts, and long rubber aprons. Prochownick depends entirely upon himself for assistance during an operation, maintaining that before he can make an assistant understand what he wants he can get it himself. In plastic operations on the perineum or pelvic tract he infiltrates with Schleich's solution, fearing a general anæsthetic on account of vomiting, which might strain the sutures. Von Bergmann's assistants wear long, white, sterilized cotton gloves. Wöfler wears long, white buckskin gloves.

OBSTETRICS AND GYNÆCOLOGY.

GREATEST ENLARGEMENT OF THE CONJUGATE DIAMETER OF THE PELVIS.—From a series of investigations, Pinzani concludes that the greatest enlargement of the true conjugate is obtained when the patient is first placed upon the back and then in Walcher's position. In contracted pelves as much as two millimetres may be gained in this way. The increase differs considerably in different cases, varying from seven to nine millimetres in the living patient. This posture will give the best results in cases where the contraction is at the entrance to the pelvis, as in flat or generally contracted pelves; he also thinks there is less danger of serious injury to the pelvic floor and posterior wall of the vagina. Attention is also drawn to the increase in the transverse diameter of the pelvic brim in this position. A claim for priority was made for the Italian obstetrician Mercurio, who described this posture in 1595. Walcher refutes this claim, as Mercurio merely suggested that position for facilitating the examination of the genital organs of a stout woman.

INDICATIONS FOR CÆSAREAN SECTION AS COMPARED WITH THOSE FOR SYMPHYSEOTOMY, CRANIOTOMY, AND PREMATURE INDUCTION OF LABOR.—Professor Leopold, of Dresden, reports that in the hospital he does not hesitate to perform the Cæsarean section when all other means have proved useless and when mother and child are in good condition. When the child is in danger he prefers craniotomy, certainly the only legitimate operation when the child is dead. In private practice craniotomy is the only operation indicated when the head is retained by a pelvis too narrow to allow the passage of a living child. Though Pinard has given as his opinion that craniotomy of the living child

ought never to be performed and condemns embryotomy of the living child, Professor Leopold, appreciating the ideal view taken by the celebrated French obstetrician, agrees with Charles, of Liège, "that it is not easy to act up to these rules." Doubtless craniotomy of a living child ought to be avoided as much as possible, and an operation innocuous to the child ought to take its place; but in difficult cases of private practice craniotomy, which saves the mother, is preferable to Cæsarean section or symphyseotomy, which gives a considerable maternal mortality.

THE ETIOLOGY OF ECLAMPSIA AND THE DIAGNOSIS OF IMPENDING ECLAMPSIA.—Davis¹ considers that all the old theories as to the cause of eclampsia must be abandoned, and that in the light of modern research the evidence is distinctly in favor of the belief that a profound toxæmia originating in the bodies of mother and fœtus causes eclampsia. The diagnosis is made by studying the excretory organs, the condition of the urine being of importance. When these organs are deficient in action, the condition of the nervous system will show that the patient is suffering from retained toxines. Norris, following with "The Preventive Treatment of Puerperal Eclampsia," not only agrees with Davis as to the cause of eclampsia, but puts his theory to practical proof by employing such means in his treatment as will keep all the excretory organs of the body working up to the normal and will prevent the retention of the toxine in the system.

DELIVERY OF EXTRA-UTERINE FÆTUS BY VAGINAL INCISION.—Donald² reported to the Obstetrical Society of London a case of ectopic gestation at the seventh month, in which the fœtus was extracted by vaginal incision. The woman had a tumor which extended four inches above the umbilicus. A loud souffle was distinctly heard. The cervix was close to the pubes and the uterus was somewhat enlarged. The post-vaginal fornix was bulged by a hard mass which almost filled the brim. This was the foetal head, and its sutures could be distinguished. After abdominal section the placenta was found in such a position that its removal was not safe. Accordingly the wound was closed, and the child delivered by incising the vagina and crushing the head. The sac was packed, through the vagina, with iodoform gauze. On the fourth day this gauze was removed, when alarming hemorrhage occurred, which was checked with difficulty. The placenta was some weeks in coming away, but was finally delivered, the patient making a complete recovery. In discussion Galabin and Cullingworth spoke in favor of the

¹ Amer. Gynæcol. and Obstet. Jour., July, 1899.

² Brit. Med. Jour., January 14, 1899.

combined operation, an abdominal incision being first made to confirm the diagnosis and the embryo then removed through the vagina. In one case Galabin removed the placenta through the vaginal incision three days after the operation, and the patient rapidly recovered. Donald ascribed the source of the hemorrhage to a placental vessel which was disturbed when the gauze was removed.

AUTOMATIC PULSATION OF THE FŒTAL HEART.—Opitz¹ reports the following cases in which the heart of a human embryo beat automatically for some time after delivery. The first child, a twin, apparently perished. Its body was placed in a valise and brought to the hospital. On opening the thorax about two hours after birth, the ventricles and great arteries were found to be contracting, at intervals of about three seconds. The heart was then removed and placed on a plate, after which the pulsations gradually ceased. In the other twin similar phenomena were present. The pulsations of the heart lasted two and one-half hours after birth and more than two hours after all other signs of life had ceased. He also narrates the case of an eight-months' fœtus, very badly deformed, in which the trunk was so fissured that the viscera were distinctly visible. Although breathing did not occur, the movements of the heart persisted for more than half an hour after birth.

POST-MORTEM DELIVERY AFTER RUPTURE OF THE WOMB.—Kendall² reports two cases of rupture of the pregnant uterus in which Cæsarean section was performed for delivery of the fœtus, movements having been noticed through the abdominal walls of the mother after death. One child soon died; the other, which weighed ten and a half pounds and was well formed and vigorous, lived.

FREQUENCY OF CONTRACTED PELVIS.—From a careful analysis of the pelvic measurements of one thousand women in the maternity service of Johns Hopkins Hospital, J. Whitridge Williams arrives at the following conclusions, which make apparent the necessity for routine pelvimetry: (1) The frequency of contracted pelvis found, 13.1 per cent., corresponds very closely with the general average of frequency observed in Germany. (2) This is due in large part to the fact that four hundred and sixty-nine out of the one thousand cases were colored women. (3) Contracted pelvis are 2.77 times more frequent in black than in white women, occurring in 19.83 per cent. of the former and 7.14 per cent. of the latter. (4) Statistics indicate that contracted pelvis are observed in about seven per cent. of the white women of this country, or about once in every fourteen cases. (5) Contracted pelvis

¹ *Centralb. f. Gynäkol.*, 1899, No. 1.

² *Ann. of Gynæc. and Pediat.*, March, 1899.

accordingly occur in our white women about as frequently as in many German clinics, as those of Rostock, Breslau, and Basle. (6) They occur here quite as frequently as in Paris (Pinard and Budin) and more frequently than in Vienna.

The subject of pelvimetry reminds us forcibly of a remark made by the late Theophilus Parvin in his lectures on Anomalies of the Pelvic Diameters: "Go without shoes, go without socks, go even without shirts, but never attempt to practise obstetrics without a pelvimeter."

Ludwig reports a case of repeated Cæsarean section by transverse incision in a patient with rachitic pelvis, followed by rapid recovery.

DELIVERY BY PODALIC VERSION IN PLACENTA PRÆVIA.—Bourlet and Mariage¹ report a case of placenta prævia in which, the condition of the mother being good, tampons were introduced and the course of events awaited. Later, there being considerable hemorrhage, the placenta was torn through and podalic version performed. The child was delivered through the centre of the placenta, which was soon after expelled spontaneously. It was fifty-five minutes before the infant breathed independently of artificial respiration.

UTERINE RETROVERSION COMPLICATING PREGNANCY.—Westphalen² reports a case in which a pregnant retroverted uterus was caught under the promontory of the sacrum, and was restored to a normal position by the distention of an elastic bag placed in the vagina.

UTERINE TUMOR COMPLICATING TWIN PREGNANCY.—E. R. C. Earle³ reports a case of tumor of the uterus with twin pregnancy, in which Cæsarean section was performed. The mother made a good recovery and the infants did well. A marked decrease in the size of the uterine tumor took place after the Cæsarean section.

ECTOPIC GESTATION.—After a rupture of a pregnant right oviduct in a multipara, Thomson⁴ removed the tube by abdominal section. Soon after a good recovery the patient complained of a recurrence of symptoms on the left side. Examination showed the presence of a left tubal pregnancy. The mass was removed *per vaginam*. Patient made a good recovery.

EXTIRPATION OF FIBROMYOMATA OF THE UTERUS.—At the meeting of the International Congress of Gynæcology and Obstetrics at Amsterdam in August, there was a very interesting discussion on the surgical treatment of fibromyoma of the uterus, with special reference to

¹ Jour. des Sciences méd. de Lille, January 7, 1899.

² Centralb. f. Gynäkol., 1899, No. 5.

³ Lancet, 1899, vol. i., p. 86.

⁴ Monatsschrift f. Geburts. u. Gynäkol., vol. ix., No. 4.

the comparative merits of myomectomy and hysterectomy. Dr. J. M. Baldy preferred hysterectomy, as he claimed that myomectomy did not cure, and a second operation had often to be performed. Kelly, the great advocate of myomectomy in America, had had three known recurrences in ninety cases and probably many others unknown. The operation, moreover, was more dangerous than hysterectomy, and the dangers of hemorrhage and sepsis were greater. In hysterectomies he preferred the abdominal route, and in abdominal operations he preferred the operation at the neck. Dr. Reynier, of Paris, concluded that vaginal hysterectomy was the operation of choice in cases in which the uterus was not larger than a foetal head, when the uterine cervix was not obliterated and there was a dilatable vulvo-vaginal outlet, the abdominal operation being reserved for cases in which the size of the uterus was greater than a foetal head.

Dr. Alexander, of Liverpool, said that, in his opinion, the object of gynæcological surgery was to remove the disease without destroying the organ. This principle had been slighted in the operations just advocated. He believed myomectomy was the operation of the future. The fibroid caused the symptoms; therefore, it was rational to remove the fibroid only. It was unjustifiable to remove the uterus in young women. In twenty-three myomectomies he had had no deaths and no recurrences. He thought that in Dr. Kelly's statistics the preservation of the eighty-seven uteri more than overbalanced the necessity for a second operation.

Dr. Sinclair, of Manchester, protested against the tendency to hurry operations. He believed strongly in the vaginal route when possible and emphasized the importance of leaving the ovary.

NEW OPERATION FOR PROLAPSUS UTERI.—Wertheim¹ in cases of prolapse suggests drawing the uterus down into the vagina and utilizing it to close a vesico-vaginal fistula, as suggested by Freund. A transverse incision is made in the anterior fornix, the vesico-uterine fold of peritoneum is opened, and the fundus uteri is drawn through the opening, each angle of the wound being sutured to the cervix. An oval denudation is then made on the anterior vaginal wall, extending from a point just above the meatus urinarius to half an inch below the transverse incision. The posterior surface of the corpus uteri is then denuded and is united to the edges of the vaginal wound. In two cases reported the operation required from twenty-five to forty-five minutes, the convalescence was afebrile, and the pre-existing vesical disturbances were at once removed. The anterior surface of the uterus underwent

¹ *Centralb. f. Gynäkol.*, 1899, No. 14.

a process of granulation, and fresh epithelium developed. The organ diminished in size and eventually presented only the condition of sharp antelexion. Colpoperineorrhaphy should be performed in order to furnish additional support.

EFFECTS OF CASTRATION ON THE VOICE.—Castex¹ reports a series of observations on singers who have submitted to castration, with and without the extirpation of the uterus. He infers that the operation has no direct harmful effect upon the voice, although the subsequent nervous disturbances may exert an influence upon it. Exceptionally the voice may assume a slightly masculine tone, but in general fine voices recover all their former range and flexibility, so that this is one of the least of the unpleasant sequelæ of castration.

DANGER OF CURETTING AN INFECTED WOMB.—Dr. Walthen, in the *Medical Age*, says: "In no form of septic infection arising in the uterus, whether it be confined to the endometrium or has extended through or beyond the uterus, is curettage indicated, at least, no further than to remove decidual débris or dead tissue which has become infected, causing sapræmia by the absorption of poisonous toxine, or a mixed infection by the germs of putrefaction and suppuration. If the disease is confined to the endometrium, nature throws out a protecting layer of granulation tissue which prevents further infection. If a sharp curette be used, all the septic matter cannot be removed, and the granulation layer, which is a defence against further infection, is destroyed, and within a few days the sepsis may extend outside of the uterus and possibly become systemic. If the disease has involved the parenchymatous structures but has not gone beyond the uterus, curetting is contraindicated because it causes traumatism without doing any possible good, and, where the disease has gone beyond the uterus,—no matter where it may extend,—curetting is positively contraindicated."

TREATMENT OF OVARIAN DISEASE WITH EXTRACT OF PAROTID GLAND.—Mallett contributes further results of investigation and summarizes as follows: "(1) It has seemed to relieve the pains of dysmenorrhœa in all cases, irrespective of alleged cause and present condition, to a greater extent than any of the numerous so-called uterine sedatives. (2) It relieves the dull aching pains referred to the back and ovarian regions. (3) Menstruation, when deranged, becomes more regular as to periodicity, less in amount, and shorter in duration. (4) During its exhibition pelvic exudates seem to soften and become absorbed more rapidly under abdomino-pelvic massage. (5) The general health, strength, appetite, and spirits seem also to improve under its

¹ *Revue Pratique d'Obstét. et de Gynécol.*, 1899, No. 1.

use, and the dull headaches which constitute such a persistent and annoying symptom in these cases are almost invariably relieved and in some cases disappear entirely. (6) The only contraindication thus far met with has been the artificial climacteric, in which the flashes of heat and cold were distinctly made more frequent and severe by its employment."

IMPORTANCE OF INTRA-ABDOMINAL EXPLORATION.—Kelly¹ strongly recommends the exploration of the abdomen as an adjunct to every coeliotomy, especially to detect the possible presence of appendicitis. Several cases are cited, in one of which pelvic inflammation was due to appendicitis, which had not been diagnosed though it could have been; in another, a convalescent typhoid case, where no appendicitis or perforation of the intestine existed, the examination showed a gall-stone with rupture of the gall-bladder. Metastasis may often thus be found in malignant growths, as of the ovary. The writer has prepared a special rubber glove reaching to the elbow for such explorations.

PROLAPSUS UTERI.—J. Inglis Parsons² has originated a new method of treatment for prolapse of the uterus. From the fact that in many instances abdominal inflammations have formed protective adhesions, he argued that injection of an irritating substance into the broad ligament would set up an inflammation and that the ligament would be shortened by the resulting adhesions. To test the correctness of this theory he injected sixteen grains of quinine into the broad ligament. No ill effects followed, and the result was most satisfactory. The same method was employed in nine other cases with equal success.

APPARATUS FOR EXSTROPHY OF THE FEMALE BLADDER.—For a case of exstrophy of the female bladder in which there was a constant dribbling of urine from twenty-eight openings, Bailey³ devised a receptacle of aluminium that proved entirely satisfactory. It was of one piece, and made to fit tightly at the fourchette and along the inner aspect of the thighs, but was left open at the top to secure ventilation. The aluminium was not in contact with the bladder at any point, a space being ground out over the multiple openings. From the most dependent part a tube conducted the urine into a deep oiled silk or paper bag, which could be thrown away after use.

¹ Med. News, December 16, 1899.

² Lancet, 1899, vol. i., p. 292.

³ Clinique, January 15, 1899.

PÆDIATRICS.

THE MICRO-ORGANISM OF SCARLET FEVER.—William J. Class,¹ referring to the unsatisfactory results of the investigations of Klein, of Crajowski, and of other careful observers in isolating a specific micro-organism of scarlatina, concluded that the fault lay with the culture media employed. After various failures he succeeded in finding a medium on which he has been able almost invariably to obtain, both from the scales and from the throats of scarlatinal patients, the growth of an organism which presents such characteristic features, both in its morphology and in its growth, that he believes it to be the specific germ of scarlet fever.

It is a diplococcus resembling, as ordinarily seen on slides made from fresh cultures, a very large gonococcus. This biscuit-shaped appearance is best seen in specimens that have been but slightly stained. In these is also noted a transverse line running through each half of the organism, giving it the appearance of a tetrad. The size varies. It is always considerably larger than the ordinary pus microbe. Lance-shaped forms, such as occur in the pneumococcus, are never met; but streptococcus forms are occasionally, though rarely, observed, as are also single cocci. They have no capsule and show no spores. Specimens from pure cultures are satisfactorily stained by watery solutions of methylene blue, by carbol fuchsin, Bismarck brown, and Pitfield's flagellum stain. They are decolorized by Gram's method, though not to the same extent as the gonococcus, the larger variety holding the stain somewhat better than the smaller.

The culture medium consists of glycerin-agar, to which is added about five per cent. by weight of black garden earth, previously sterilized by discontinuous heating. On this medium scales from a scarlet-fever patient are placed with a sterile platinum loop, and the tubes put in an incubator, the temperature of which is kept at about 35° C. Within from forty-eight hours to one week small, whitish, semi-transparent colonies appear along the track of inoculation and around the scale. On agar-agar, glycerin-agar, and gelatin no growth takes place, and bouillon does not become clouded. Milk does not appear to be affected, but the organism apparently multiplies in it. On potato there is no growth. Rabbits and guinea-pigs were not affected by subcutaneous injection of pure cultures, nor by scarification wounds, nor by intra-abdominal injection.

The germ described has been cultivated from the scales of about

¹ Chicago Med. Recorder, May, 1899, p. 873.

thirty cases of typical scarlatina, and has also been found in the throats of these patients and in cases of angina occurring in persons exposed to scarlet fever in whom no eruption appeared, and lastly in the throats of children in a family where one member had typical scarlatina, the children being in normal condition when the culture was made, but subsequently developing a typical rash, in the scales of which the same organism was found.

ORTHOFORM AND ANESON IN PAINFUL MOUTH AFFECTIONS OF CHILDREN.—Göpert¹ has used both these drugs with satisfactory results as local sedatives in painful mouth affections of children. The anæsthetic effect lasts about an hour and a half, and the application is best made about twenty minutes before eating. Aneson is applied to the inflamed mucous membrane by means of a wad of cotton, and orthoform may be dusted on by the powder-blower. Both drugs have an unpleasant taste, especially the orthoform.

COMPARATIVE VALUE OF RECENT ANTISEPTICS IN PÆDIATRIC PRACTICE.—Gustavus M. Blech² divides antiseptics useful in pædiatric practice into four classes: (1) those which act on the respiratory tract; (2) those acting on the gastro-intestinal tract; (3) those affecting the urinary apparatus; (4) those which influence the whole organism. Urotropin is decomposed by the urine and destroys the bacteria in this fluid. Guaiacol carbonate is comparatively tasteless and non-irritating, and is very useful in the treatment of chronic bronchitis. Tuberculosis, he states, can be cured in its first and second stages by the antitoxic treatment, though drugs have but little curative effect in the later stages of this disease, and Murphy's nitrogen treatment has proved a failure. Nosophen has been proved harmless; antinosin has been used in solution of two and a half per cent. strength without producing irritation. The author has used it exclusively as a disinfectant and cleansing solution in the nasal passages. Eudoxine, the bismuth salt of nosophen, is an excellent remedy in diarrhœa, experiments having proved that by the action of the gastric juice stable salts of bismuth are formed, the nosophen passing on unaltered to the intestine.

CONNECTION BETWEEN OPTHALMIA AND SYNOVITIS AS SEEN IN YOUNG INFANTS.—As the synovitis of gonorrhœa is probably the result of absorption of morbid products from the urethral mucous membrane, and as the conjunctival mucous membranes offer equally favorable

¹ Jahrb. f. Kinderheilk., 1899, No. 1.

² Trans. Amer. Med. Assoc., June 7, 1899.

absorbing surfaces, Clement Lucas believes that the involvement of these two parts could scarcely be referred to any other cause, and there seems no doubt that the case reported was one of gonorrhœal rheumatism consequent upon absorption from the conjunctival surface. The correctness of the clinical observation was submitted to bacteriological proof by Darien in 1889, the gonococcus of Neisser being found in the secretion from the conjunctiva; and Deichmann in 1890, by aspirating the inflamed knee of an infant three weeks old suffering from purulent ophthalmia, was able to show the presence of the gonococcus in the secretion taken from the joint, thus completing the chain of evidence.

KOPLIK'S SIGN.—J. Sobel¹ discusses the value of Koplik's sign in diagnosis. The initial symptoms of influenza often suggest measles, which can be excluded by the absence of Koplik's spots or confirmed by their presence. Nothing excludes German measles more conclusively than the absence of this sign. It is present in a second attack of true measles as well as in the first.

A RARE COMPLICATION OF MEASLES.—Von Stark² observed, on the second day of the eruption of measles, marked symptoms of spinal meningitis and irritation of the nerve roots. Full recovery followed in three weeks. No other cause but measles could be determined; the child had been previously healthy and had sustained no injury.

ACUTE NEPHRITIS FOLLOWING THE INGESTION OF SACCHARIN.—G. A. Himmelsbach³ reports a fatal case of acute nephritis in a previously healthy infant to whom saccharin had been fed in a preparation of cow's milk.

PAD-LIKE SWELLINGS ON THE FEET AND HANDS IN RICKETS.—A. H. Tubby⁴ calls attention to the frequent occurrence in rickets of a pad-like formation upon the dorsum of the foot and occasionally upon the hand, which he believes has not previously been described. In these cases the soft tissues upon the dorsum are decidedly thicker than in healthy children, and the swelling may resemble a flattened elevation or be dome-like in shape. Its color is that often seen in the skin elsewhere in rickets, and may be compared to that which would be produced by the injection of yellowish-white wax beneath the skin. While in a healthy child the skin of the dorsum of the foot, if pinched between the fingers, can be moved independently of the subcutaneous tissue, in many rickety children these are quite inseparable and only a more or less thick fold composed of both can be made. In many cases it

¹ Med. Record, June 3, 1899, p. 781.

² Jahrb. f. Kinderheilk., vol. xlvii., p. 2.

³ Buffalo Med. Jour., June, 1899.

⁴ Pædiatrics, January 1, 1891.

appears as if solid œdema were present in the skin and subcutaneous tissue. This pad in some cases originates in swelling and thickening in the neighborhood of the epiphyses of the metatarsal bones; hence it is more frequently seen on the anterior than the posterior part of the dorsum. When the bones are so affected, distinct bending may be felt about the epiphyseal lines, and doubtless both the perichondrium and the periosteum are thickened as well. In the early stage of rickets the swelling is often semi-fluid. In cases of a few months' duration it is semi-solid, and in those of more than a year's duration it is hard and resistant. The author has tabulated one hundred cases of rickets, eighty-six of which had dorsal pads. He believes that, if cases be kept under observation for a long time, the pad will be seen to undergo the three stages of consistency noted above. From eighteen to thirty-six months after the onset of the disease the subcutaneous pad disappears, at the same time with the general flabbiness and undue pallor of the skin, and leaves the bony changes apparent to the touch.

PRIMARY CONGENITAL HYPERTROPHY OF THE HEART.—Simmonds¹ reports the post-mortem findings in an infant—the issue of healthy parents and normally developed—which died during delivery. All the abdominal and thoracic viscera except the heart were well developed and presented no microscopic alteration of their tissue. The great vessels, the canal of Botall, the umbilical vessels, the fossa ovalis, and the valves of the heart were perfectly normal. The dimensions of the heart, however, were extraordinary, measuring five and a half centimetres in length, six centimetres in breadth, and fourteen centimetres in circumference at the base. Its capacity was forty-five cubic centimetres, and it weighed forty-four grammes instead of nineteen or twenty grammes, the normal weight of the foetal heart at term. These excessive dimensions were due to a uniform hypertrophy of both ventricles, the right having a thickness of nearly and the left of over a centimetre. There was no myomatous tumor. The only feature that distinguished this foetal hypertrophy from *cor bovinum* of the adult was that the papillary muscles participated only slightly, if at all, in the enlargement. Histological examination of the myocardium revealed no abnormality except some recent ecchymoses near the surface. The author thinks that this condition of congenital hypertrophy is due either to circulatory disturbances or, as Virchow holds, to a diffuse myomatous neoplasia of congenital origin. In favor of the latter hypothesis was the fact that the hypertrophy involved only the ventricular walls and septum and not the papillary muscles.

¹ Münchener med. Woch., 1899, No. 4, p. 108.

NIGHT TERRORS CAUSED BY ADENOID GROWTHS.—Rey has found in all of thirty-two cases of night terrors that adenoid vegetations were present. After removal of the growths the terrors subsided. He, therefore, believes that adenoids are the most frequent cause of these disturbances, which result from carbonic acid poisoning produced by interference with respiration.

CONSTIPATION IN YOUNG CHILDREN.—T. C. Martin points out that often violent but futile efforts at evacuation in infants depend upon anatomical peculiarities. First, the infant's lower gut is muscularly deficient; second, the motility of the intestine within the abdomen is obstructive to defecation; third, in infants the rectal valves are obstructed; fourth, the infant's anus is not sufficiently expansive. A suggestive contribution on the relations between constipation and the renal condition is made by Kobley. He states that, in suspected obstruction of the bowel and in cases that alternate between constipation and diarrhœa, he has found during the period of constipation tube casts, red and white corpuscles, and renal epithelium in the urine, usually without albumen. This condition disappeared with the relief of constipation. He suggests that the presence of renal structures in the urine in the case of peritonitis may have a similar cause, that this may possibly result from a reflex spasm of the vessels, and that it is more the result of pain than of mere constipation.

ANÆMIA AND ATHREPSIA IN INFANTS.—In the treatment of infantile anæmia and athrepsia Muggia, of Turin,¹ injects hypodermically the yolks of freshly laid eggs with physiological salt solution. The infant gains in weight, and there is an increase in the percentage of hæmoglobin and in the number of red blood corpuscles.

TRANSMISSION OF MORBIFIC AGENCIES TO INFANTS BY THE NURSE'S MILK.—Ausset² saw an infant which presented symptoms closely simulating meningitis, caused evidently by the habitual drunkenness of the wet-nurse. Courmont and Cade³ report a case of typhoid fever in a nursing mother which serves to demonstrate the possibility of transmitting to a nursling certain pathological properties acquired by the blood-serum of the nurse.

¹ *Revue mensuelle des Maladies de l'Enfance*, May, 1899, p. 240.

² *Société centrale de Méd. du Nord*, February 24, 1899.

³ *Lyon Méd.*, September 8, 1899, p. 5.

PATHOLOGY AND BACTERIOLOGY.

Reference to much of the work done in pathology and bacteriology will be found among the other divisions of the "Progress of Medicine," but many of the articles on these topics published during the year are too technical for insertion in the pages of the CLINICS.

On June 27th Virchow formally opened the new pathological museum which bears his name and has been built under his superintendence. It cost about five hundred and sixty thousand marks, and contains over twenty thousand specimens, collected almost wholly by Professor Virchow and representing the history of pathology during the past half-century.

Virchow completed fifty years of service as professor in Berlin on December 7th. He was presented with an illustrated address and many marks of appreciation and respect by his colleagues.

Four out of the fifteen annual meetings of the London Pathological Society are hereafter to be held at one or other of the London laboratories, with the object of affording opportunity for the giving of demonstrations. The first meeting of this character was held at the Jenner Institute of Preventive Medicine on November 7, 1899.

THE KETANI DISEASE.—Tanaka ¹ describes the etiology and pathogenesis of the ketani disease, an infection peculiar to Japan and caused by a variety of *acarus*. The attack begins suddenly with a chill, followed by elevation of temperature, resembling that seen in typhoid. The pulse is accelerated and the number of respirations increased. The patient loses his appetite and grows worse and nervous symptoms supervene. On the third to the seventh day of the disease an exanthematous rash resembling urticaria appears, the face becomes red and turgid, the conjunctivæ are markedly injected, the tongue is coated, and the glands are swollen in all parts of the body. Bronchitis of a more or less severe type is present. Splenic dulness is increased. Constipation is the rule. Death takes place in from forty to seventy per cent. of all cases on the tenth to the thirteenth day. The *acarus* penetrates the skin, and can be detected by a reddened area covered with a scab, especially when irritated by the clothes or scratching. When removed with a needle the parasite is found to be still alive. Second attacks are rare. Horses, cats, and dogs do not have the disease, though it is pathogenic for mice, rabbits, and guinea-pigs. The article contains admirable drawings of the animal, which measures from 0.16 to 0.38 millimetre in length and from 0.10 to 0.24 millimetre in breadth. It secretes no poison, as the scor-

¹ *Centralb. f. Bakteriol.*, October 28, 1899.

pion does. After years of patient bacteriological search the author was finally able to obtain from the lungs of one dead of the disease a pure culture of proteus. It did not occur in the blood, but has been found in the urine within the third day of the illness, as well as in the sputum and rarely at the site of inoculation. The organism was never found in the acarus, though searched for in over a hundred cases.

TABES DORSALIS AND GENERAL PARALYSIS OF THE INSANE.—Dr. F. W. Mott, speaking before the Pathological Society of London, stated that he considered these diseases to be identical in their pathological processes,—viz., a primary sclerosis and inflammatory or subinflammatory conditions in the vessels or adjacent membranes, due to irritation caused by the products of degeneration and a formative proliferation of the glia elements. Sir William Gowers considered that the question of the etiological identity of tabes and general paralysis was largely one of words, and doubted whether common causation predicated identity in diseases which differ so widely in symptoms as the cerebral form of general paralysis and the pure form of tabes.

BACTERIOLOGICAL DIAGNOSIS OF TYPHOID FEVER.—Many methods have been described whereby the growths of the typhoid and colon bacilli may be differentiated by the use of specially prepared media. One of the most recent of these is by Piorkowski,¹ who studied forty cases of typhoid fever. A small quantity of normal urine which has become slightly alkaline by standing for several days at the ordinary temperature is added to the ordinary peptone-gelatin. The solution is filtered and sterilized for fifteen minutes and again twenty-four hours later. Petri dishes are prepared on ice, and the plates inoculated with the fecal material and placed in a thermostat at from 21.5° to 22° C. In from fifteen to twenty-four hours the typhoid bacillus, if present, develops in small, clear, oblong, yellowish colonies with rounded edges, differing from the colonies of the bacillus coli, which are sharp-edged, coarsely granular, larger, and darker in color. If there be any doubt, the indol reaction, the curdling of milk, and gas production in grape-sugar bouillon may be resorted to. A diagnosis has thus been made on the third day of the disease and in cases where Widal's test was not positive. Unger and Wittich have confirmed this method. Cesaris-Demel² has pointed out that a bouillon made of liver, when inoculated with the colon bacillus, quickly ferments and becomes cloudy, and remains so for a long time. With the typhoid bacillus there is no fermentation, and in one or two days a flaky precipitate falls to the bottom of the

¹ Deutsche med. Woch., November 26, 1899.

² Centralb. f. Bakteriöl., November 26, 1899.

tube, just as when typhoid serum is added to an ordinary bouillon culture. Gorbunoff¹ adds litmus to the liver bouillon, which becomes red with the colon bacillus, and the precipitate blue, the solution above being clear. Cesaris-Demel finds that on standing the first becomes violet and the latter rose-colored.

PLEURISY DUE TO THE TYPHOID BACILLUS.—Labiche² has studied ten cases of pleurisy due to the typhoid bacillus. This affection is found more frequently on the left side, perhaps owing to the nearness of the spleen in this region. The sero-fibrinous deposit in the pleural cavity becomes hemorrhagic and then purulent.

FORMATION OF BONE IN THE BRAIN.—Thomas³ found post mortem in the brain true bone resulting from the presence of coccidia oviforma. The tumor had caused no symptoms. There was a small calcareous mass in the anterior central convolution, which was atrophied. On microscopical examination, this mass was found to consist of true bone. Outside of the bone was a layer of osteoid tissue and the whole was surrounded by neuroglia tissue,—a secondary gliosis. In the centre of the nodule was a large space filled with granular detritus, in which were many small ovoid bodies. Many of these bodies, the coccidia, had a distinct capsule and were filled with granular matter. The author could find no similar case reported.

FUNGUS FOOT.—J. T. Arwine and D. S. Lamb⁴ report the fifth case of "fungus foot," or mycetoma, in America, and give illustrations of the amputated feet and the condition of the bones, with drawings from sections showing some peculiar-looking bodies which the writers pronounce a variety of actinomyces.

A HITHERTO UNDESCRIBED PATHOGENIC MICROCOCCUS.—In a case of acute ulcerative endocarditis MacCallum and Hastings⁵ found a micrococcus pathogenic for man, which they obtained in pure culture twice during life. The chief peculiarities which distinguish it from the pyogenic cocci already described are: (1) Its mode of growth, which resembles that of the micrococcus lanceolatus, the diplococcus intracellularis meningitidis, and the streptococcus, rather than that of the pyogenic staphylococci. (2) Its action on gelatin, which resembles that of the staphylococci. (3) By its activity in peptonizing milk and coagulating blood-serum it differs from all the above-named pyogenic cocci.

¹ Vratsch, 1899, No. 1.

² Gazette hebdomad. de Méd. et de Chir., 1899, vol. xvii.

³ Med. and Surg. Reports, Boston City Hospital, 1899.

⁴ Amer. Jour. Med. Sci., 1899, vol. cxviii., p. 898.

⁵ Johns Hopkins Hospital Bulletin, 1899, vol. x., p. 46.

THE MICRO-ORGANISM OF SCARLATINA.—From a study of four thousand slides, Class¹ describes a large polymorphous diplococcus as the cause of scarlet fever. Grünbaum is quoted as having found, two years ago, in a scarlet fever case a diplococcus which agglutinated with the blood taken from another person suffering from scarlatina.

NEW SERUMS.—Just at the close of the year came the announcement from Paris that two new sera had been discovered, the one for the cure of dipsomania and the other for the prolongation of life. MM. Broca, Saplier, and Trébault announced the discovery of a serum, which they call "antiethylene," for the cure of chronic alcoholism. Dipsomania appears to be perfectly amenable to treatment by injection of a counter-poison. Scientists have observed that certain poisons develop in the blood a substance called by Metschnikoff "stimulinus." These three observers attempted to isolate the stimulinus by the study of its action upon dipsomaniacs. Animals in which the alcoholic habit had been cultivated were inoculated with this serum, obtained from a horse, and from that moment they displayed such an aversion to alcoholized food that they died rather than touch it. Experiments have also been tried on inveterate drunkards, with equally satisfactory results. From the first injection the men manifested an insurmountable aversion to strongly alcoholic liquors, although, curiously enough, a sort of liking for wine remained.

From the laboratory of the Pasteur Institute comes the announcement that Metschnikoff has succeeded in accomplishing that in which Brown-Séquard failed. By means of certain sera he revitalizes the dying cells of the body, and thus enables them to throw off the deadly poisons which accumulate in the system, owing to the loss of vitality of the cells, and cause old age and ultimately death. We are not at present in a position to pass judgment, but the fact that the name of Metschnikoff is coupled with the discovery carries great weight and makes us eager for further developments.

A NEW MICROCOCCUS IN ENDOCARDITIS.—MacCallum and Hastings² describe a "new" micrococcus, which they name micrococcus symogène, isolated from the blood during life and from septic infarctions of the aortic valves after death in a case of acute endocarditis in a man aged thirty-seven years. When grown on nutrient gelatin its morphology resembles that of the pneumococcus. It stains by Gram's method, liquefies gelatin, and peptonizes milk, first rendering it acid and coagulating it. The organism is pathogenic for rabbits, dogs, and

¹ Med. Record, 1899, Nos. 1504 and 1509.

² Centralb. f. Bakteriöl., March 28, 1899.

white mice. The lesions in the dog after experimental infection were strikingly similar to those found in man. Venous injection of the coccus set up a septic endocarditis, with aortic involvement, from which the organism was recovered. In man, as in the dog, the organism was found throughout most of the organs of the body.

EXPERIMENTAL INOCULATION OF EMBRYONIC CELLS.—Birch-Hirschfeld and Garten¹ have reported some interesting and promising experiments, consisting in the introduction of embryonic cells into an adult animal of the same species as that from which the cells were taken. Very young embryos were used, as their proliferative capacity is much greater. The liver was selected as the place of inoculation, because of its abundant supply of nourishment and because of the easy differentiation of its tissue from that implanted. In most cases new growths were found, but these were not tumors, as they were not progressive.

EXPERIMENTAL PANCREATITIS.—From his experiments in the production of pancreatitis, acute and chronic, with the formation of sugar in the urine and fat-necroses in the peritoneal cavity, by the injection of weak acids and other irritants, including pathogenic bacilli, into the duct of Wirsung in dogs, Dr. Simon Flexner² doubts whether, in human beings, the gastric juice could escape so freely into the pancreas through its ducts, or that such numbers of bacteria are likely to enter the organ as to produce rapidly fatal pancreatitis. Nor does pancreatitis seem to be a bacterial disease. He is positive, however, that fat-necrosis in pancreatitis is due to a perversion of the pancreatic secretion, and that such perversion in the absence of pancreatitis may cause fat-necrosis.

DR. LAMBERT LACK'S CANCER THEORY.—In a note to the *Lancet*, Dr. Lambert Lack states that he has long been impressed by the belief that the epithelial cells of cancer are themselves the sole infective agents; that this cancer epithelium is practically normal epithelium, only out of place; and that from the very commencement of the cancer it is growing in the lymph spaces. He thought from this that, if the normal epithelium by some accidental means should obtain entrance into the lymph spaces, it would find no barrier to its continued growth and would produce all the phenomena of cancer. Up to the present time he has performed but a single experiment to test this view. He obtained an emulsion of the epithelial cells from the healthy ovary of a healthy rabbit and placed it in the animal's peritoneum. The animal died fourteen months afterwards, and on examination, masses of growth

¹ Beiträge zur path. Anat. und Allg. Path., vol. xxvi., No. 1, p. 132.

² Proc. Path. Soc. Phila., December 1, 1899, p. 25.

having the characteristic features of typical ovarian cancer were found in the abdominal and thoracic cavities. Experiments will be carried out to confirm and extend these results, but until these have been completed, he says, no general conclusions can be drawn.

THE CANCER PARASITE.—Dr. Curtis, of Lille, reports negative results in his search for a cancer parasite. His deductions are drawn from a series of experiments now in progress for over four years. He calls particular attention to the fact that tissues derived from superficial epitheliomata are not the best for experimental work, since they are so liable to be contaminated with various outside organisms. He used carcinomata of the breast and testicle in his investigations. In careful experiments with eighteen such cases, he was unable to obtain any parasites that would grow on any media, and was unable to produce any contagion in other animals. The author believes that the positive results obtained by other observers are due to defective technique. As to the Oppler-Boas bacillus, it need only be said that organisms closely resembling it have been found in non-cancerous cases, such as the one reported by Karl Sternberg. Even Boas now acknowledges that it is not pathognomonic.

PSORIASIS AND EPITHELIOMA AFTER THE LONG-CONTINUED USE OF ARSENIC.—Dr. M. B. Hartzell¹ reports a case of psoriasis with a sequel of epithelioma, and reviews the literature of the subject. His patient had taken considerable doses of arsenic for a long time, and in eight of the eleven other reported cases arsenic had been given during a protracted period. In all the cases psoriasis was of long standing; in all but three some form of keratosis was a marked feature. The subject is well worthy of further investigation.

SPECIFIC IMMUNITY AGAINST EPITHELIAL CELLS.—Von Dungern² has made some observations upon the behavior of epithelial cells when injected from one animal into another. He chose for his experiments the ciliated epithelial cells from the trachea of the ox, which were removed immediately after the death of the animal, without mixture with red blood-cells or connective tissue, and placed in a physiological salt solution. When this material was injected into the abdominal cavity of a guinea-pig, the movements of the ciliæ in the peritoneal exudate could be observed after they had been there for days. After three days the movements became less, and the epithelial cells underwent a cystic change, but remained visible for from six to ten days. The length of time which elapsed before their movements ceased or the ciliæ were

¹ Amer. Jour. Med. Sci., September, 1899.

² Münchener med. Woch., No. 38, 1899.

destroyed is markedly shortened if a second inoculation is practised in the same animal. Von Dungern believes, from this experiment, that there is produced in the blood of the animal so injected an antitoxin and that Pfeiffer's reaction may be obtained with the serum and other ciliated cells. The writer considers that this experiment may be important in regard to finding an antitoxin for carcinoma, which may be of sufficient strength to destroy any epithelial cells remaining after the surgical removal of the body of the tumor.

DIFFERENTIAL STAIN FOR TUBERCLE BACILLUS.—Marzinowsky¹ describes a method, designated new, of differentiating the bacilli of tubercle, of leprosy, and of smegma. He uses the carbol fuchsin (two parts of water to one part of stain) and Loeffler's alkaline methylene blue. The smear is placed in the fuchsin for three or four minutes and, after washing, in the methylene blue for from two to three minutes. Human tubercle is stained by this process only after a long immersion in the fuchsin; avian tubercle stains quite readily; the bacillus of leprosy takes up the red stain easily, and is readily decolorized by alcohol or after ten minutes by the methylene blue. The smegma bacillus stains blue in from ten to fifteen minutes.

TUBERCLE BACILLI IN MILK AND BUTTER.—The *British Medical Journal* reports that all observations up to the present time tend to show that the presence of tubercle bacilli in milk is a rare event. Rabinowitsch made fifteen experiments from fourteen butter-factories. In the product from the factory examined twice, tubercle bacilli were found on both occasions. None were found in the other specimens examined. The pseudo-tuberculosis bacilli were frequently found. Inoculation experiments were made in all cases. During June and July daily examinations from the infected factory showed that seventy per cent. of the butter contained living tubercle bacilli. Animals inoculated therewith showed the typical symptoms of tuberculosis. Animals injected with pseudo-tuberculosis material died of peritonitis. The infected factory in Berlin was isolated.

¹ Centralb. f. Bakteriöl., May 31, 1899.

OPHTHALMOLOGY, OTOTOLOGY, AND LARYNGOLOGY.

In spite of the unsatisfactory issue of orbital heteroplasty by the introduction of sponge grafts, the use of metallic or glass globes has been followed by most successful permanent results, particularly the method proposed by Oliver, of Philadelphia, in which a glass globe is inserted directly into Tenon's capsule and held in position by suturing the four rectus muscles directly in front, and bringing the conjunctival membrane together over them.

The operation for the removal of the crystalline lens in cases of high myopia has probably found its proper sphere of usefulness; fewer cases are reported, and these have been more carefully selected and better suited to the method.

During the past year much work with the microscope in the study of neoplasms has been accomplished, both here and abroad, particularly those involving the uveal tract.

Atribaelin, a new renal extract, has been experimented with by Wolffberg, of Breslau. He has found that it is an active irritant of the sympathetic, having a very marked effect on the blood-vessels of the eye. Clinically he has employed it in cases of iritis, irido-cyclitis, and episcleritis, using it in association with atropine.

A biscuit-shaped intracellular pseudo-gonococcus, which decolorizes with Gram's method, has been found in the human conjunctiva by Krukenberg, of Rostock.

Protargol has been very successfully used in the treatment of all forms of ocular disease in which nitrate of silver has been previously employed, its application being less dangerous and less painful. Argentamin has also proved of value, particularly in cases of trachoma and purulent ophthalmia, possessing a very rapid bactericidal action and penetrating deeply into the tissues.

Jonnesco reports that in ten cases of true exophthalmic goitre a cure was obtained in six and an improvement in four by resection of the cervical sympathetic. The exophthalmos disappeared first, then the nervousness and tachycardia, and finally the goitre. The results in cases of secondary exophthalmic goitre were less successful. This operation has been successfully tried in glaucoma by Ball, of St. Louis, and Suker, of Toledo. Resection of the entire ganglion was necessary to insure success. Zimmerman also employed the method successfully in a case of glaucoma. Istropoulis, of Constantinople, found the operation of no benefit in a case of monocular glaucoma. Galvanization of

the same nerve has quite recently been proposed by Allard, who claims that two cases seen at the beginning of the disease were cured.

A patient, with no history of gout, who suffered from repeated attacks of tonsillitis, ejected a calculus, forty-two by thirty-six millimetres in size and weighing almost an ounce, during a fit of violent coughing.¹

Dr. Wendell C. Phillips strongly recommends the use of pure carbolic acid in chronic suppurative otitis media in which necrosis exists and in the sinuses often found in mastoid wounds which are so difficult to heal. The carbolic acid is prepared by adding enough water to the crystals to hold them in solution; the applications are at first made by means of the cotton probe; later by a spray apparatus with a fine tube for introduction into the aural canal, the acid being sprayed into the attic and middle ear. In nearly all the cases thus treated the suppurative process commenced to subside almost immediately. That it has a helpful effect in necrosed conditions of the bone cannot be doubted. It causes pain and discomfort for a few minutes, but less than alcohol does.

From a most careful study of ocular diphtheria, Coppez, of Brussels, believes that no hard-and-fast line can be drawn between the croupal and the diphtheritic membranes, the one merging into the other. He also states that the diphtheritic bacillus, the pseudo-diphtheritic bacillus, and the bacillus of xerosis are distinct and separate types.

STENOSIS OF THE LARYNX.—In recurring laryngeal stenosis after intubation, Dr. Louis Fischer² indorses the opinion of Dr. O'Dwyer, that this condition is usually the result of traumatic injury, either from improperly constructed or ill-adapted tubes or from the accumulation of calcareous deposits upon the tube. In these cases he has employed with much success a method of intralaryngeal treatment of the ulcerated surface, suggested by O'Dwyer, which consists in the use of tubes coated with medicated gelatin. The best results were obtained by immersing a rubber tube in a hot solution of gelatin containing either twenty-five per cent. of alum, twenty per cent. of ichthyol, or paraffin medicated with three per cent. of iodoform or europen.

DISEASES OF THE ANTRUM.—Dr. Charles Stedman Bull states that these are by no means as rare as has been supposed, the inflammatory diseases most frequently met with being mucocele and empyema. In examinations of the antrum for these conditions he prefers the method devised by Heryng, as improved by Vohsen and still further improved

¹ Brit. Med. Jour., January 7, 1899.

² Jour. Amer. Med. Assoc., May 13, 1899.

by Luc and Escat. His conclusions on the subject of diseases of the sinuses adjacent and secondary to the orbit are as follows: 1. The prognosis of all forms of malignant orbital tumors is unfavorable, and, if the tumor is primarily one of the deep facial bones or their sinuses, the prognosis is positively bad. 2. With the single exception of encapsulated tumors of the orbit, surgical interference is almost invariably followed by a return of the tumor, and the growth of the secondary tumor is more rapid than that of the primary lesion. With each succeeding operation the period of quiescence becomes shorter and the rapidity of the growth increases. 3. The patient's family, and in certain cases the patient himself, should in the beginning be told of the serious nature of the trouble, and be warned that complete removal of all the diseased parts is a hopeless task. The burden of the decision as to surgical interference must rest upon the patient. 4. Repeated operations in these cases undoubtedly shorten the life of the patient. While it is our duty, therefore, to operate in all cases in which there is unbearable pain, we should decline to operate merely for the sake of relieving temporarily physical disfigurement, especially if we are convinced that by so doing we shorten the life of the patient.

COLOR-BLINDNESS AND THE X-RAYS.—David Walsh¹ denies that the retinae of color-blind people are strongly acted upon by the Röntgen rays. He took four children, aged from eight to eleven years and of good intelligence, whose color sense was defective in red-green, their form sense and perception of light being normal. When looking steadily at the brilliantly lighted tube, they showed no signs of photophobia. They recognized objects, such as keys, when held against the tube or screen.

CHORIORETINITIS LEPROSA.—Dr. J. Bistis, of Constantinople,² reports three cases of chorioretinitis due to leprosy. These are interesting because, while leprosy not infrequently manifests itself in the anterior segment of the eye, the posterior segment has been regarded as immune from its invasion. The pathological changes, as might be expected, closely resemble those present in syphilitic inflammations of the retina and chorioid. As the ophthalmoscopic studies of Schlesinger have shown that the fundus is free from any such lesions in syringomyelia, von Düring regards their presence as a valuable point in differentiating those cases of this disease that are at times so difficult to diagnose from the nervous form of leprosy.

¹ *Lancet*, 1899, vol. i., p. 1290.

² *Centralb. f. prakt. Augenheilk.*, November, 1899.

DERMATOLOGY.

THE RÔLE OF PUS ORGANISMS IN DISEASES OF THE SKIN.—Dr. G. T. Elliot, of New York, in discussing this subject, showed that the causes of purulent dermatoses might be of a known chemical or microbic nature or they might be unknown. Cutaneous infection might occur by metastasis from the interior of the body or directly by the bacteria effecting an entrance through the cutaneous follicles. Saprophytic staphylococci were to be found in large numbers upon the hairy scalp, beneath the nails, and in the perigenital region. Abscesses of the skin and subcutaneous tissue were due to the staphylococcus pyogenes aureus or albus, or to the streptococcus pyogenes. Phlegmon had been shown in ten out of fourteen cases to be caused by the streptococcus pyogenes. Carbuncle was thought by Unna to be due to a special streptococcus, yet experimental inoculation with the ordinary streptococcus had produced the disease. Furuncle was due to the action of staphylococcus. Impetigo vulgaris was believed by Unna to be produced by an ochre-yellow coccus which he called impetigococcus. He differentiated a number of different forms of impetigo. Folliculitis of lanugo hairs was said by Wickham to be caused by staphylococci. French writers regarded acne vulgaris as dependent upon staphylococci. Ecthyma was thought to be due to the same coccus. Sabouraud asserted that certain tineæ (in the horse) had pus-producing properties. As an instance of metastatic influence the discovery of Neisser's gonococcus in the lesions of furunculosis, occurring in a subject of gonorrhoeal urethritis, was cited. Contradictory results were often noted in the bacteriological reports, and investigations showed that there were other causes for suppurative processes besides the recognized pyogenic micrococci, and that non-pyogenic organisms were capable under favorable conditions of taking on pus-forming qualities. The whole question was looked upon as being still in a very unsettled condition, and no classification was attempted.

ADVANCES IN DERMATOLOGY.—Dr. John A. Fordyce, of New York, in his address before the American Dermatological Association, passed in review all the important advances which had been recorded in dermatology since the last meeting, dwelling particularly upon the employment of the sera, and the treatment of lupus, hypertrichosis, and other affections by means of the X-rays. He did not regard the latter as so efficacious and free from danger of deep burning and scarring in these affections as electrolysis. In speaking of the therapeutic application of concentrated chemical rays (Fennsen) in lupus and alopecia

areata, he said lenses of rock crystal had been used to exclude certain rays. As regarded cancer, while the embryonic theory had much in its favor, he believed little doubt existed at the present day as to the infectious nature of the disease. Still, the prediction was made that it would be a long time yet before its true pathogenesis became known.

TATTOO MARKS.—The removal of tattoo marks by tattooing over them with glycerole of papain has been very successfully employed by Ohman-Dumesnil, and is well worth the trial. The process is similar to the original tattooing, except that the glycerole of papain is used instead of ink.

CAUSE OF ECZEMA.—The trend of opinion seems to be verging towards the view that eczema is a parasitic disease, or at least that some forms of it are of this nature; but the parasite, being unable to fasten itself pathologically in a perfectly normal skin, requires a suitable soil for its development. Leroddo, after extensive investigations, adds his proofs to the theory of the morococci advanced by Unna. He claims to have found the parasite in both acute and chronic eczema, though often associated with other microbes, and he has reproduced the disease by inoculation with cocci. As to its auto-inoculability there is still considerable difference of opinion. Török is opposed to the view of Unna, and states that the lesions produced by inoculation were not true eczema, but impetigo, and he thinks that the presence of the morococcus in the vesicles of eczema does not prove that it plays more than a saprophytic rôle. Beatty states that, if the morococcus is to be accepted as the essential cause of the disease, psoriasis, in which Unna also found these organisms, must be a form of eczema, a view that almost all would be reluctant to admit.

ERYSIPELAS.—Hutchison thinks it probable that the micro-organisms after once having gained access to the cutaneous tissues never afterwards leave them, and may remain latent for an indefinite period, ready at any time, on provocation, to show activity. This theory would help to explain the fact that one attack of erysipelas does not prevent others, but, on the contrary, predisposes to further outbreaks. The antistreptococcus serum treatment seems to be gaining ground; from reports on its use, however, it does not seem to be indicated in mild cases, but only in those of grave character, and in such it should certainly be given a fair trial.

X-RAY DERMATITIS.—Since the introduction of the X-ray in medicine this new condition has engaged the attention of the medical profession. The results of long exposure have been redness, desquamation, pain, swelling, vesiculation, bleb-formation, sloughing, chronic inflammations, loss of elasticity and sensibility, and thickening of the skin,

loss of hair, nails, etc. Most serious of them all is sloughing, which may necessitate amputation. The causes of these accidents are not yet fully explained; among them may be mentioned personal idiosyncrasies, too short a distance of the tube from the part, too strong a current, and too long exposure. Tuttle has stated that all cases of X-ray burns so far reported have followed exposure to X-rays generated by the Ruhmkorff coil, and that none of these accidents have been known to occur in connection with the static machine. If this is so, the profession should know it. Various plans for prevention of these burns have been proposed, among them being a *grounded* thin sheet of aluminum or gold-leaf and perforated plates of lead or other metallic leaves. Unna recommends a zinc jelly containing cinnabar and bismuth oxychloride in the proportion of ten per cent. This is to be painted on thickly, and over it is placed a film of absorbent cotton. The treatment of the milder cases of these burns is essentially the same as that for similar cutaneous affections. Curetting in severe sloughing has been advised, but in such cases the process has probably extended to the bone, and it is therefore of little avail.

LEPROSY.—There is now complete unanimity of opinion that the bacillus lepræ is the essential causative factor, but its absence in some cases goes to show that in certain tissues or at certain stages of the disease the bacillus is not present. The evidence as to the means of transmission of the disease is not conclusive. Schaeffer's experiments are interesting. In a room containing lepers he placed slides upon the table and floor, near which he had the patients read aloud. Large numbers of bacilli were afterwards found upon these slides, indicating a probable method of communication. Many observers believe that with the introduction of modern hygiene the disease will disappear, and Hansen, of Norway, shows a decrease in that country alone from three thousand in 1856 to seven hundred in 1897. It is generally admitted that the disease is contagious, but that, under favorable conditions of climate, food, air, surroundings, and habits, the dangers of its communicability are practically *nil*.

SERUM TREATMENT OF ERYSIPELAS.—Dr. A. de Martigny, at a meeting of the Canadian Medical Association, reported excellent results from the use of Marmorek's serum in the treatment of erysipelas. He says that ten cubic centimetres might be sufficient in a given case, provided the serum were taken from the same family of streptococci as that represented in the disease, but, as this was not always known, twenty cubic centimetres had better be administered.

FORENSIC MEDICINE.

TUBERCULOUS MENINGITIS.—Waibel¹ describes a case of this disease which is of unusual interest and importance because of its medico-legal bearing. The District Court called for expert testimony as to whether tuberculous meningitis could be caused by trauma. March 4, 1898, a school-girl was struck upon the head by a companion so severely that everything looked black before her eyes and the left ear became red and swollen. She complained of severe pain in the head, but continued to go to school. On the third day after the injury, towards evening, she vomited three times and took to bed. Previous to the injury the child had always been healthy, cheerful, and lively, but from the day of the blow she became depressed and moaned and wept frequently. At times she complained of pain in the head, especially in the forehead. With the exception of weakness and constipation, examination revealed nothing on which to base a diagnosis. On March 13th her expression had become dull and there was a peculiar brilliancy in her eyes. Her color changed frequently; the pulse was normal; the temperature was 38.5° C.; the lungs and spleen were normal. On March 14th her mind was cloudy, she groaned and shrieked frequently, and complained of a very severe pain in the head. The heart was irregular, at times intermittent; the breathing also was somewhat irregular. The pupils were normal, and the temperature 38.5° C. On this date a diagnosis of meningitis, with a bad prognosis, was made. On March 15th the patient was weaker, still conscious, but apathetic and without rigidity of the neck. This condition continued with variation till the 23d. The temperature gradually increased to 39° C.; the abdomen became scaphoid, the pulse was at times regular, then irregular, being at one time superficial and rapid and then very deep. The consciousness was not much disturbed. From March 24th the child became much worse, remaining entirely unconscious for hours. There was slight convulsive spasm in the extremities, and she frequently grasped at the air and picked at the bedclothes. The legs showed slight spasmodic symptoms; the pupils were often larger than normal and unequally dilated; the eyes frequently turned upward. During the last few days there was almost entire consciousness, the pulse was very rapid and small, the patient dying March 30th, twenty-six days after the injury. Post mortem the meninges were found to be congested, the posterior veins especially being markedly filled. In both lateral ventricles there was a large amount of clear fluid, causing distention.

¹ Münchener med. Woch., 1899, No. 5.

The meninges of the base were infiltrated with a gelatinous exudate and showed very small miliary tubercles, especially numerous along the course of the vessels. The convolutions were somewhat flattened. The lungs were markedly distended and showed rather numerous gray tubercles on the clear red cut surface. The bronchial glands were as large as hazel-nuts, with cheesy, yellow tuberculous masses throughout, partly softened in the centre, so that a small cavity could be seen. The heart and abdomen were normal.

The author regards the bronchial glands as the primary focus of the disease, from which the meningitis and general tuberculosis developed, and thinks that the trauma produced a disturbance of the brain and the chest, which made it possible for the tubercle bacilli to enter the neighboring blood- and lymph-vessels, and be carried over the entire body, especially to the brain, and there grow. The following points favor the traumatic origin of the disease in the case: 1. The child was previously healthy, without emaciation, cough, headache, fever, or changes in disposition. 2. From the moment of injury she complained of headache, dizziness, and weakness, and three days later vomited and had disturbed sleep. From this time the symptoms increased in severity. According to the experiments of Koch and Baumgarten, tubercles in the brain and other organs require from ten to twelve days for their growth. In the present case the first severe brain symptoms appeared on the tenth day of the disease. Similar cases of traumatic brain tuberculosis have been reported. The author and a medical committee from the University of Munich testified that they believed the disease was in this case caused by the trauma, but there was no conclusive proof, as there is no characteristic difference between a tuberculous meningitis caused by trauma and the spontaneous variety.

MEDICAL EXPERT TESTIMONY.—M. Cruppi laid before the French Chamber of Deputies a bill for reforming medical expert evidence. He proposed that a list of medical experts, to contain only the names of men of undoubted scientific ability, should be drawn up every year. The accused person should have the right to name his or her own expert, who should work in co-operation with the expert named by the judge. In cases of disagreement between the two experts, the matter should be decided by a committee composed of eminent scientific men. The bill was referred to the Commission of Judicial Reform.

ANATOMY AND PHYSIOLOGY.

Fremont has found that both the total free acid and total chlorides were increased by the following drugs, the activity of which is in the order mentioned: white wine, gentian, condurango, carduus benedictus, hops, simarubra, menyanthes, columbo, quassia, strychnine, and pilocarpine. White wine more than quadrupled the total acidity and more than doubled the total chlorides. Gentian and condurango followed closely after. Pilocarpine increased the total acidity only seven per cent. and strychnine only forty-three per cent.

At the seventeenth German Congress of International Medicine, held in Carlsbad in April, 1899, Von Mering and Aldehoff reported the results of a series of experiments upon animals, from which they concluded that neither the vagus, the celiac plexus, nor the splanchnic has any apparent effect upon the motility or the secretion of the stomach. They concluded that the ganglion cells lying within the walls of the stomach are the nerve centres from which these functions arise. Nevertheless, they believe that these centres are under control of the central nervous system, as physiological and clinical experience indicates. Stimulation of the pneumogastric nerves constricts the pylorus and produces no other appreciable effect upon gastric motility.

A curious side light is thrown upon the action of the spleen by the experiments of Blumenreich and Jacoby, who found that guinea-pigs from which the spleen had been removed resisted far better than other animals the injections of various pathogenic bacteria and other toxins. Among others they experimented with injections of diphtheritic toxin. They explain this singular fact by the marked hyperleucocytosis which follows splenectomy. The increase of leucocytes was almost entirely limited to the lymphocytes. When we remember Ehrlich's view, that leucocytosis largely originates in the spleen, this result seems still more curious.

One of the most important subjects in histology, and one capable of exercising considerable influence on physiology and pathology, is the question of the composition of cell protoplasm, and to what extent the structure usually observed in it is artificial or due to post-mortem changes and the action of the reagents employed in preparing it for examination. Hardy, in the *Journal of Physiology*, details some of the more interesting facts as to the nature of the changes taking place under the action of fixatives, by comparing the fixation of known homogeneous substances with that of cells. If a considerable portion of insoluble matter is separated by the process of dissolution, a continuous

framework is formed. If only a small quantity is separated, a granular deposit will result. The appearance of structure in the cell may also be due to the presence of or to post-mortem changes in secretion masses. The cells of glands hold cell substance and secretion masses in "secretion vacuoles," and it is very probable that the cell protoplasm between the secretion vacuoles is pressed out into thin masses and that they become the same as or equivalent to the threads in the cells of other kinds. Langley proved this true of the cells of mucous salivary glands.

Hopkins and Hope, studying the causal relationship of the excretion of uric acid to diet, confirmed the statement that, during the period of increased nitrogen excretion which follows a meal, the increase in uric acid has a briefer duration than the increase of urea, and occurs characteristically in the earlier hours of the hyperexcretory period.

As a result of many experiments, Athanasin concludes that phosphorus does not give rise to increased fat formation, but merely causes a migration to the liver, kidney, etc., of fat previously stored in the body, inasmuch as there was no increase in the total fat above that found in the control animals.

Siegfried Rosenberg, investigating the physiological consequences of gastro-enterostomy, found that changes were produced in the whole process of digestion. In regard to the elaboration of food, he found a deficit in the digestion as well as in the absorption of nitrogenous, fatty, and carbohydrate foods, which he attributes to the changed relations of the digestive fluids to one another. He believes the inclination to frequent vomiting is due to antiperistalsis of the intestines, which forces the intestinal contents into the stomach, where they act as an irritant.

Rollet discusses the physiology of sensation, and says that the old doctrine of the identical constitution of nerves must be abandoned, on the ground of new histological and physiological observations. He then develops his conception of what he calls the idiopathy of the specific tissues, especially the neurons. By this term he would have us understand that adaptation of the neurons to their adequate stimuli by means of which they finally react only to their own specific stimulus. He concludes that in the skin special nerves for pressure, warmth, cold, and pain have to be assumed in order to explain the observed facts.

Nothing new of importance has been developed in the study of anatomy, and we are forced to place ourselves with the class of reformers who would make this study more simple and less brain-tiring than at present by eliminating many of the long and senseless names applied to anatomical parts. Such a reformation has been proposed by Gerrish, his ideas being summed up under the following heads: 1,

the words should be Latin in form; 2, they should be of Greek origin as far as possible; 3, the terms should not attempt to be descriptive; 4, they should be designations; 5, terms consisting of only one word should be given the preference; 6, shorter words, as a rule, should be preferred to longer ones; 7, each object should have but one word; 8, a given term should be applied to but one object; 9, the names of persons should not be included in the designation of objects; 10, the terms indicative of position and direction should be equally applicable to all vertebrates.

FUNCTION OF THE THYMUS.—J. Beard¹ positively affirms that he has discovered the true function of the thymus. His researches were conducted mostly upon the *Rai batis*, or smooth skate. As soon as leucocytes are formed from the epithelium of the thymus they wander into the mesoblast and later into the blood. They at first emerge singly, but when their production is rapid they issue in masses, thus causing larger or smaller "breaks" at various points on the surface of the organ. The writer says, "It is Kölliker's great service to have shown that leucocytes arise from the original epithelial cells of the thymus; from Gulland's researches we know that the first leucocytes are found in the mesoblast in the neighborhood of the thymus; and finally it has fallen to my lot to show that the first leucocytes arise in the thymus from its epithelial cells, and that thus it is the parent source of the leucocytes of the body." When the first leucocytes appear in the thymus-epithelium, there are no leucocytes and no lymphoid structures of any sort in any other part of the body. No other lymphoid organ is known which in its development resembles the thymus. Of the theory that this gland ceases to exist, he says, "It no more ceases to exist than would the Anglo-Saxon race disappear if the British Isles sank beneath the waves." The simile is an appropriate one, for just as the Anglo-Saxon stock has made its way from its original home into all parts of the world, and has there set up colonies for itself and for its increase, so the original leucocytes, starting from their birthplace and home in the thymus, have penetrated into almost every part of the body, and have created there new centres for growth, for increase, and for useful work for themselves and for the body.

THE BRAIN OF HERMANN VON HELMHOLTZ.—Professor Von Helmholtz died at the age of seventy-three years. The weight of his brain with the coagulated blood was seventeen hundred grammes, without the blood about fourteen hundred and forty grammes, which is nearly one hundred grammes heavier than the average. The weight of the brain

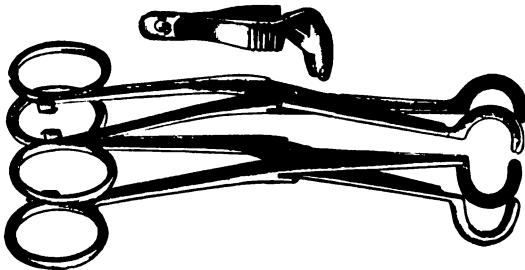
¹ Lancet, 1899, vol. i., p. 144.

alone is not an index of mental capacity. The sulci were peculiarly deep and well marked, especially in the research portions of the brain. The brain was not preserved. Helmholtz had been somewhat hydrocephalic in youth, as was the case with Cuvier, whose brain weighed eighteen hundred and thirty grammes. It has been asserted that hydrocephaly in youth is an advantage, by enlarging the skull and giving the brain space for growth.

NEW INSTRUMENTS.

NEW FORCEPS FOR INTESTINAL ANASTOMOSIS.—This forceps, recently devised by Ernest Laplace, consists of two parts, which are really hæmostatic forceps, curved into a semicircle on each side; only held together by means of a clasp, they open as two rings. They are opened within the intestine, and serve the same purpose as Senn's rings, bringing serous membrane to serous membrane. Accurate suturing is the operation of the present. Therefore, if these forceps are within the gut and sutures are applied, as they would be with the help of Senn's rings, it follows that sutures are introduced all around except where the forceps penetrate the parts that are sutured. The suturing being done, the forceps are released by loosening the clasp and withdrawing

FIG. 1.



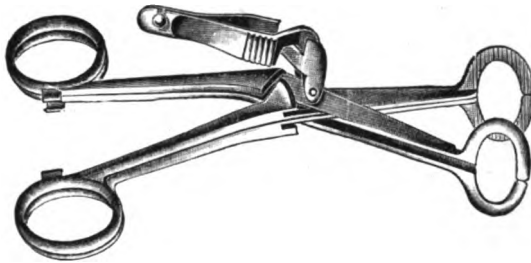
The hæmostatic forceps bent into semicircles, and clamp to hold them together.

the forceps out of the small opening, first one-half, then the other, when the operation is finished by a stitch or two. This forceps will serve for the operation of end-to-end anastomosis and also of lateral anastomosis.

Gastro-Enterostomy (Lateral Anastomosis).—An incision is made in each part to be anastomosed about the length of the diameter of the

rings to be used. An incision is made into the stomach and one into the gut. Opening the forceps one blade is introduced into the stomach, the other blade is put into the intestine, and the two blades are then closed. This holds in close contact the serous membrane of the stomach and intestine, while sutures are applied all around, except, of course, at the small place where the instrument penetrates the stomach and the gut. The handles are made to raise the part, and afford support as well as a broad surface to work on. Having united the stomach and intestine as far as is desired, the forceps are easily loosened by removing the clasp.

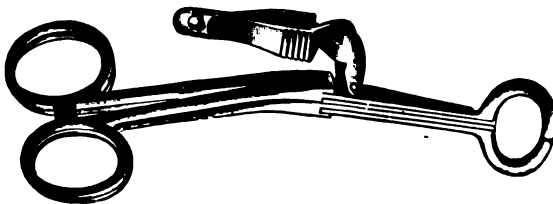
FIG. 2.



The forceps clamped together, and opened as two rings.

The forceps constituting one-half of the ring is loosened and drawn out with a semicircular motion, then the other is removed in the same way. Finally one or two more stitches are applied to close the opening through which the forceps was removed. This completes the operation, which permits a much more regular suture than could possibly have been applied without a support, and the support does no harm to the intestine. The mechanical means only serve to make the manual execution better. The guidance of the ring ensures preservation of the proper direction in suturing.

FIG. 3.

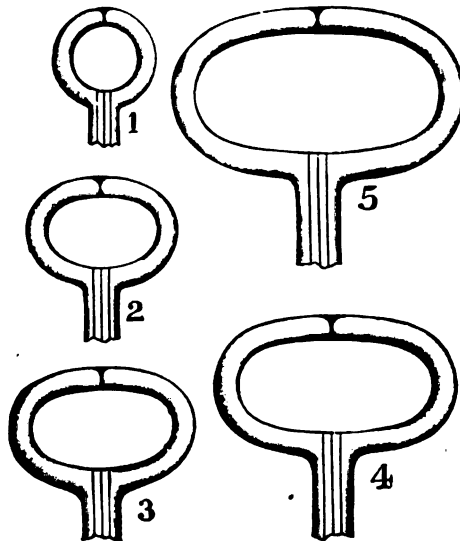


The forceps closed.

End-to-End Anastomosis.—Having resected the required amount of intestine, the two ends are first united by a fixation stitch at the four

cardinal points. This assures the right relation of the mesentery in the two ends of the gut. The forceps are introduced between two of these stitches. The blades are opened apart so that one penetrates one end and the other the other end. The serous surfaces are inverted or pushed in. This may be facilitated by drawing a thread around the united ends between the two blades. When the forceps is clamped serous membrane is in apposition to serous membrane. The sutures are then ap-

FIG. 4.



Various sizes of rings made for the forceps blades.

plied all around the clamped surfaces, and the rest of the procedure is the same as for gastro-enterostomy.

Invagination.—Should it be desired to make an entero-enterostomy with invagination of the ends of the gut, the accompanying forceps (Fig. 5) facilitates the invagination and obliterates the end of the gut.

FIG. 5.



Invagination forceps.

It consists of a long-slender, straight hæmostatic forceps. The end of the gut is clamped and pressed down within the caliber of the gut; the serous membrane on each side thus rises and is rapidly sutured under

the control of the instrument. When the suturing is done, the instrument is loosened and withdrawn; one more suture is applied at the point where the instrument penetrated. This makes a very good stump, and is very expeditious.

The method offers the following advantages: First, rapidity and accuracy of suturing without leaving any foreign substance within the gut; second, an absolute control of the field of operation by means of the assistance of the handles of the forceps; third, the facility with which the forceps is applied, preventing the escape of intestinal contents during the operation.

Numerous intestinal operations have been performed, both here and abroad, by means of the forceps, and its great practical usefulness has been amply demonstrated.

OXYGEN INHALER.¹—From a T-piece secured by a head-band run four rubber tubes, kept in place by flexible wire and by a carrier steadied by a nasal bridge. The carrier can be adjusted to a long or a short nose by the screws and arms at the extremities of the horizontal limb of the T-piece. The four tubes, wire-mounted and curved, end in vulcanite nipples. The nasal tubes do not pass into the nostrils, but are merely inserted at the most anterior part of each nasal aperture, permitting free inspiration and expiration. The mouth tubes run to the angles or just within the angles of the mouth. The object has been to avoid the sense of suffocation that the ordinary face-piece imparts and that due to the tube in the nose, and do away with a mouth-piece which "semi-conscious smokers persist in treating as a pipestem."

AN IMPROVED STETHOSCOPE.—Andrew H. Smith² has perfected an attachment, applicable to stethoscopes of the usual form, which admits of being slipped under the back, and permits dorsal auscultation while the patient is in the recumbent position.

HONORS TO MEDICAL MEN.

The memory of Dr. William Pepper was honored in Philadelphia by the unveiling of a bronze statue on December 20th. Two of his plans matured during the year,—the Export Exposition held during the autumn, and the establishment of a Free Museum of Science and Art, which was opened on December 20th. His expectation that the govern-

¹ F. W. Forbes Ross, *Lancet*, May 13, 1899.

² *Med. Record*, April 1, 1899.

ment would inaugurate a National University will also probably be shortly realized. There is but little doubt that if he had lived he would have been its first rector.

The honors conferred by Queen Victoria on the occasion of her eightieth birthday included a baronetcy for J. S. Burdon-Sanderson, physiologist, regius professor of medicine at Oxford University, and the K. C. B. for Michael Foster, professor of physiology at Cambridge University.

A monument to Pasteur was unveiled and a Pasteur Institute opened at Lille on April 9th.

A statue of Professor Von Helmholtz was unveiled in the court of the University of Berlin, June 6, 1899, in the presence of the German emperor.

The Paris Academy of Medicine awarded its Lecaze prize (ten thousand francs) to Dr. Widal, for his serum method of diagnosing typhoid fever.

HYGIENE.

THE GERMICIDAL VALUE OF PROPRIETARY DISINFECTANTS.—Drs. Harrington and R. M. Pearce¹ have made chemical analyses of a dozen of the popular proprietary disinfectants recommended for use in the sick-room, and have determined their germicidal value in the treatment of typhoid stools, tuberculous sputum, and diphtheritic membrane, which were exposed uniformly to the action of the several disinfectants for two hours. Cultures were then made in fresh bouillon, and at the expiration of forty-eight hours the result, growth or no growth, was noted. In the case of sputum the process was different; the sputum which had been supposedly disinfected was inoculated into the subcutaneous tissue of guinea-pigs, which, unless they died sooner, were killed at the end of six weeks. A control animal killed after five weeks showed typical tuberculous lesions.

The bacteriological tests showed that not one of the agents most commonly sold can be regarded as a safe and trustworthy disinfectant. Each one was given ten separate tests. Three of the preparations proved to be absolutely inert, and the others gave from thirty to ninety per cent. of unsuccessful results. The results were far from uniform in repeated experiments with the same agent; thus, it might sterilize one typhoid stool and show no result with another. Only one of the

¹ Jour. Boston Soc. Med. Sci., March, 1899.

entire twelve succeeded in sterilizing sputum, and that one is not sold as a general disinfectant, but as an "air purifier." Carbolic acid, five per cent., formaldehyde, one per cent., and a five per cent. solution of a preparation containing cresols were also tried on the same objects. The carbolic acid was successful in only two out of six trials, one of the two being with sputum; the other two killed the organisms in every case.

Chemical analysis showed that the ingredients used are such as have a reputation as disinfectants, and that the preparations are not intentional frauds. The commonest ingredients were chloride and sulphate of aluminum, and chlorides of zinc, magnesium, sodium, and potassium. Two contained copper, one lead, and one iron salts. One was wholly chloride of zinc, another was a plain solution of permanganate of potassium, another was a fairly strong preparation of chlorinated soda, and three were strong-smelling preparations containing neutral tar oils.

The proprietary disinfectants are not only unreliable, but are expensive, enormously so in comparison with the simple and effective one per cent. solution of formaldehyde.

SANITATION IN SANTIAGO DE CUBA.—The United States special commissioner, who has been in Cuba in an official capacity almost continuously since hostilities were suspended, says that in Santiago may be seen in full operation the work which the government of the United States has been impelled to undertake. The machinery of the government is running with a fair degree of smoothness, and the men responsible for it, from the humblest official to the commander of the province, understand their business and are masters of the situation.

The disagreeable odors of the typical Cuban city have been less pronounced in Santiago, where whitewash, lime-wash, fresh paint, and all sorts of disinfectants have deodorized the surrounding atmosphere and made the whole town habitable. Streets are no longer used as sewers, and the unhappy individual who violates the law and escapes the lash of the sanitarian's whip is compelled to work on the streets for thirty days. This official and one hundred and six men, with thirty-two good United States mule-teams and carts, have dug out from the streets of Santiago the filth of ages and are now able to keep them clean. The garbage of the city is burned, with the aid of the great disinfectant petroleum. The doors of houses had to be broken in. People making sewers of the public thoroughfare were publicly horsewhipped in the streets of Santiago, and eminently respectable citizens were forcibly brought before the commanding general and sentenced to aid in cleaning the streets which they were in the habit of defiling. The campaign

resulted in complete surrender to the authorities, and the inhabitants of Santiago, regardless of class, have had their first object lesson in the new order of things introduced by the war.

THE SANITATION OF HAVANA.—Although cases of yellow fever occur from time to time in Havana, but one death from the disease was reported during the month of April. With the United States troops quartered in the city, and with the large number of Americans who remained there all winter and later, nearly all of whom are non-immune, this freedom from the endemic scourge is remarkable. The fact that the annual recrudescence was kept off, with so much fresh material for the disease to thrive upon, raises the hope that our sanitary measures will in time succeed in extirpating this as well as other diseases, and that Havana may soon be held up as an example for Philadelphia to imitate. General Ludlow has been authorized to spend three hundred and thirty-five thousand dollars on sewerage and paving the streets of Havana and on other engineering work. Several miles of streets are being repaved, and the suburban drives are being bettered. There are three thousand men at work in the engineering department. Large sums are being spent for painting, whitewashing, and cleaning sinks, cesspools, and sewer-pipes inside the houses. After the house-to-house inspection which was made when the Americans first got control of the city, at which time twenty-five thousand eight hundred and seven habitations were inspected, notices were sent out to the occupants to comply with the sanitary regulations.

According to the official statistics of the sanitary department of Havana, there were eight hundred and forty-four cases of infectious diseases in the city from June 1st to June 15th, as follows: forty-seven cases of consumption, six of diphtheria, three of yellow fever, eight of typhoid fever, one of typhus fever, one of smallpox, one of scarlet fever, and seven hundred and sixty-four of measles. During those fifteen days there were three hundred and eighteen deaths, against two thousand one hundred and sixty in the corresponding period of the previous year. One of the officials of the Marine-Hospital Service in that city is reported as saying that there was not nearly so much yellow fever in Havana last year (1899) as usual, but that there was more than has been admitted, and that this will continue to be the case just so long as the Americans use the former Spanish military hospitals, which will always breed contagion. Such purification of these structures as has been attempted is superficial, and the buildings, which are an ever-present menace, should be destroyed.

THE INFLUENCE ON HEALTH OF CHEMICAL PRESERVATIVES IN MILK.—Foulerton says that boric acid and formic aldehyde are the only

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preservatives which at the present time are used to any great extent for milk, unless one includes sodium bicarbonate, which is sometimes added to check souring. Salicylic acid, which was said at one time to be extensively used in milk, is now probably seldom employed; it is in no case a preservative, and its use should be absolutely prohibited. Benzoic acid seems to have been occasionally used, but never extensively. The amount of preservative not injurious to health which might be permitted in milk should be limited to such a quantity as will suffice to keep the milk sweet and fit for use as human food for a period of twenty-four hours in the hottest weather.

Annett has found that these chemicals, when so used, are injurious to the health of the consumer, and particularly so to that of young infants. It is easy to conceive that the great mortality from diarrhœa among infants in many large towns may be closely connected with the practice, especially during the summer months, of systematically "doctoring" milk by means of the preservatives used by milk purveyors, dairymen, and milkmen.

THE SMOKE NUISANCE.—That admirable association, the Coal Smoke Abatement Society, of London, has already done much towards the movement for a clean city, a matter in which medical men are particularly interested. Fresh air and sunlight are the two great remedies not only against tuberculosis but also against many other diseases. That smoke is an enemy of both these beneficent agencies is undeniable. It blots out the sun, and the average housewife will not keep her windows open when torrents of smut are blown in and make her house filthy. A dirty atmosphere is the chief enemy to open windows and must be fought against. Such a movement is particularly desirable in the great cities of the United States.

TYPHOID FEVER AND THE FAULTY WATER-SUPPLY OF PHILADELPHIA.—The epidemic of typhoid fever in Philadelphia during the early part of 1899 was not only a material disaster but a moral disgrace. The general consensus of opinion attributes the epidemic to the gross neglect of obvious duties by the local authorities. According to the *New York Medical News*, there has been an annual average of nearly three thousand cases of typhoid fever and over five hundred deaths from this disease in Philadelphia during the last ten years. This state of affairs, which has for years grown worse, not better, is a blot upon civilization, a growing shame in the face of the world; and yet Councils sit meekly by and let the carnage go on. The largest number of cases came from portions of the city supplied from reservoirs by practically direct pumping. Philadelphia's most immediate and urgent need seems to be filtered water.

Dr. George Woodward, as a member of the Board of Health, has investigated the source of pollution of the Schuylkill River. He says that thousands of notices have been sent to householders advising them to boil the water. He adds that, though it is proper that people should know of the deplorable condition of the water furnished to them, he does not think it right to refer to the Schuylkill River as an open sewer. This latter assertion is not, however, borne out by the details given in his report. A sample of water taken from Mill Creek below Rosemont was clear, odorless, and looked like good drinking-water. When, however, the analyst of the Board, Mr. William C. Robinson, examined it, he found that it contained sewage material in active decomposition. A sample obtained at West Conshohocken, which was described as turbid and smelt like the waste-water from woollen mills, contained so large a quantity of albuminoid ammonia as to be totally unfit for drinking purposes. Similar results were obtained with water taken from other places. All along the river hundreds of mills drain their poisonous dyes and waste into the water, while stables, refuse, and manure-heaps add their quota thereto.

The supply is also deficient in quantity. The river has enough to provide for all needs, but the pumping stations have been shamefully neglected, and the quantity of water which they provide to Germantown, in the Twenty-second Ward, is altogether insufficient. That Councils should hesitate to incur the enormous expense of bringing water from a pure but distant source may be understood, but there is no good reason why they should not long ago have organized better methods for pumping and the prevention of the waste of water. Finally, when water is taken from a river which receives the crude sewage of vast populations and the untreated refuse from innumerable manufactories, the least that can be done is to institute filtering beds of the best and safest description.

It is not surprising that under these circumstances a powerful agitation has been started in favor of water reform, but at the same time, to avoid a reaction which would be dangerous to the cause of sanitary reform in general, it should be made quite clear that a pure water-supply is not the only sanitary measure required. If contaminated water sufficed to produce typhoid fever, every one who drank the water would have the fever. Evidently other causes are also at work. Contaminated water is undoubtedly a very efficacious means of spreading typhoid fever among those who are predisposed, but persons whose reduced vitality renders them an easy prey to this disease are likewise liable to contract other diseases. If they have pure water, this does not always mean that their lives will be spared: it may simply mean that

they will die from some other disease. In all probability careful local investigation would show that in those wards where the epidemic has proved especially fatal there are other causes at work besides the foul water-supply. The present is an excellent opportunity for bringing to light all these defects, and for obtaining the sanction and popular approbation for all measures of reform dealing not only with the water-supply, but with many other sanitary defects which undoubtedly exist.

TREATMENT OF YELLOW FEVER IN HAVANA.—In response to a series of questions previously drawn up and circulated among them, Cuban medical men held meetings in Havana for the purpose of laying before Dr. O'Reilly, the head of the American Sanitary Service in that city, their views on the subject of yellow fever. Dr. Fuentes appears not to be enthusiastic regarding the so-called Sternberg treatment, which consists in attempts to render the digestive canal antiseptic and to keep its contents alkaline, by means of the administration of minute doses of perchloride of mercury with large quantities of sodium bicarbonate, other antiseptics, such as naphthol, salol, and benzonaphthol, being valuable adjuncts to the sodium bicarbonate. His own method of treatment, if the patient is seen within the first three days of the disease, is to prescribe thirty grains of ipecacuanha in two powders as an emetic, and, six to eight hours after it has acted, fifteen grains of calomel combined with the same quantity of jalap in two powders, one to be taken an hour after the other, in this way removing the contents of the digestive canal. If persistent vomiting should occur, the stomach is washed out, and, in order more thoroughly to clear out the intestine, a soft rubber tube is introduced by the rectum as far as possible, and an intestinal douche of warm water or of a solution of sodium bicarbonate is administered. In case the patient is not seen until after the third day, but before the conclusion of the fifth, the calomel and jalap powders only are given. Afterwards antiseptics—perchloride of mercury, salol, benzonaphthol, or naphthol—are prescribed, and, of course, milk diet is insisted upon until convalescence. Dr. Fuentes says that the mortality varies greatly, being sometimes below fifteen per cent. and again as high as sixty per cent.; generally speaking, it may be put down at twenty-five or thirty per cent. Persons not acclimatized should reside at a distance from Havana, especially during their first year in the country. They should be very careful to avoid everything likely to irritate the digestive organs, especially the liver, and to avoid all kinds of excess. They should not take alcohol except in great moderation, and should wear suitable clothing. No overripe fruit or any fruit out of season should be touched. Sodium bicarbonate should be taken daily

and a saline purge every two or three weeks. Exposure to the sun's rays for any length of time must be guarded against. Special caution is needed in the spring.

MISCELLANEOUS.

ERROR OF SEX AS A GROUND FOR DIVORCE.—Neugebauer¹ collected reports of fifty cases in which divorce was granted on account of an error in the sex of one of the parties. It seems incredible that such a mistake should occur so often, but the conformation of the genitals of some of these hermaphrodites was such as to deceive medical men, who in some instances could not agree as to the sex of the individual, even after an examination. In one remarkable case a male hermaphrodite had successively three husbands, and it was only after she, or rather he, had given a venereal disease to the third husband that the latter applied for a divorce. In forty-six out of the fifty recorded cases a man had married a male hermaphrodite. In one case the sex of the parties is not given, and in three women married female hermaphrodites. In one of these instances the supposed husband later became pregnant, and was delivered of a full-term child. Many a matrimonial engagement has been broken on account of the discovery that the parties to the agreement were of the same sex.

REORGANIZATION OF THE ARMY MEDICAL CORPS.—At the recent meeting of the American Medical Association it was resolved to recommend to the government: (1) that the medical corps of the army and navy be enlarged to meet properly all the demands which may be made upon them; (2) that transportation of medical supplies be under the control of the medical department; (3) that a corps of sanitary inspectors be created, whose duty it shall be to examine into the sanitary condition of camps and bodies of troops in transit and advise in relation thereto; (4) that the government establish permanent camp sites, the selection to be subject to the approval of the surgeon-general, for use in the mobilization of large masses of troops; (5) that a professor of military hygiene be appointed at West Point to instruct the cadets in the principles of sanitation; (6) that the medical officers of the National Guard be subject to rigid examination both for admission to the service and for promotion; (7) that the surgeon-general of the army and navy in time of peace and war be empowered to call into

¹ Centralb. f. Gynäkol., May 6, 1899.

requisition the services of skilled specialists; and (8) that the President of the United States be respectfully urged to recommend to Congress the appointment of an army medical commission, to be composed of physicians and sanitarians taken from military and civil life, including the surgeon-generals of the army and navy, whose duty it shall be to prepare a report containing a detailed plan of a modern system to govern the medical departments of the army and navy in peace and war.

AMERICAN PHYSICIANS FOR THE UNITED STATES CONSULATES.—

On December 13th five Marine Hospital doctors—viz., G. M. Corput, S. B. Grubbs, W. C. Hobden, G. M. Magruder, and E. K. Sprague—sailed for Southampton as the advance guard of a new service of the government which is to be established abroad. They are to be attached to the United States consulates at different large ports in Europe, and will look after the steerage passengers coming to the United States. Their duties will be to keep the Marine Hospital Bureau informed as to the prevalence of plague or other epidemic diseases, give advice and render other appropriate service to the consuls, in conjunction with whom they will issue bills of health to vessels leaving for ports in the United States, Cuba, and Porto Rico. This will facilitate the landing of the steerage passengers, and at the same time stop the sending of ill or crippled persons to this country and check the spread of contagious diseases. The ports at which these stations have been established are London, Hamburg, Genoa, Queenstown, Antwerp, Rotterdam, Glasgow, Bremen, Liverpool, Havre, Southampton, and Marseilles.

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